The Builder.

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Billiard Room, "Blawith," Grange-over-Sands.—Messrs. Willink & Thicknesse, Architects ..... *Single-Page Ink-Photo.*
Principal Entrance, County Council Offices, Wakefield.—Messrs. Gibson & Russell, Architects ..... *Single-Page Ink-Photo.*
Garden Front of a House at Enfield.—Mr. T. W. Cutler, F.R.I.B.A., Architect ..... *Single-Page Photo-Litho.*
Design for Framlingham Grammar School.—Mr. W. D. Gravell, A.R.I.B.A., Architect ..... *Single-Page Photo-Litho.*

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Sodium, and the St. Pancras Explosions.

THE origin of the recent explosions in street boxes used in connexion with the electrical supply of the St. Pancras district has at length been traced to its source—at least, an explanation of the matter has now been offered by Major Cardew, the electrical adviser of the Board of Trade, which most scientists would admit as a very reasonable one in view of the facts ascertained. He has discovered a remarkable deposit on some of the insulators, which, on investigation, was found to contain a considerable quantity of the metal sodium. This metal, under certain conditions, becomes highly inflammable on contact with water, and it is believed that on ignition it fired the escaped coal-gas found in the street-boxes, hence the explosions. Sir Courtenay Boyle, on behalf of the Board of Trade, states that it devolves upon his Department, without delay, to investigate the causes of the deposit of the sodium with a view to its prevention. The matter is, in official circles, regarded as of such a pressing nature and to present such difficulty from a scientific point of view that the assistance of the Royal Society and of the Institution of Electrical Engineers was at once invoked on the discovery being made. The Board of Trade has apparently made up its mind that other similar explosions that have recently happened in the metropolis are due to the same cause, and their prompt action is to be highly commended.

In the meantime, in order to prevent, as far as possible, the recurrence of explosions, the Board of Trade strongly urged the St. Pancras Vestry to provide a thorough system of ventilation for the conduits and street boxes, to reduce the space in the boxes within which an accumulation of gas could occur, and to make a thorough inspection of the mains, and remove the deposit from the insulators wherever it was found to exist. This has now been done, so far as the St. Pancras district is concerned, but we do not gather that other Metropolitan bodies in charge of electric lighting arrangements have been counselled to do likewise, so that the danger still lurks in our midst pending the inquiry of the scientists concerned, which may be a very protracted one.

This seems a seasonable opportunity to make a few remarks on sodium, the special properties of which do not seem to be generally understood, though it would naturally be impossible, except by means of a very tedious and careful examination, to throw much light on the actual cause of its deposition on the insulators referred to. Sodium is a chemical element; but it occurs nowhere in nature in an uncombined condition. It was first discovered by Sir Humphry Davy, almost immediately after that celebrated man had discovered potassium, and by the same means, viz., by exposing a piece of moistened hydrate of soda to the action of a powerful voltaic battery, the alkali being put between a pair of platinum plates connected with the battery.

When placed upon the surface of cold water it decomposes it with violence, but does not ignite the hydrogen liberated, unless the motion of the sodium be restrained, when the cooling effect is much less; but the hydrogen is lighted on the sodium being placed in hot water. In a state of rest, on the application of water, the reaction is more dangerous than the corresponding phenomena developed by potassium, because it frequently leads to most violent explosions. This point is to be especially noticed. The metal does not affect carbonic oxide at any temperature. Its fusing-point is 95·6°C.; specific gravity ·98; before the blowpipe it gives a strong yellow flame. When pure it is of a silver-white (almost white) tint, and is so soft at ordinary temperatures that it may be easily cut with a knife, or pressed between the finger and thumb; whilst it oxidises rapidly in the air.

Sodium combined with silica is present in small quantity in most silicates. In union with chlorine, as common salt, it is the most important mineral ingredient of sea-water, and can be detected in minute quantities in air, rain and river water. As might naturally be supposed, it is, as a constituent of the atmosphere, more abundant on or near the sea-coast than inland. The proportion in London air is so minute that the deposit on the insulators can hardly have been derived from that source.

Metallic sodium was for years manufactured by reducing sodium carbonate, or soda ash, by means of charcoal or other form of carbon. It is used in the preparation of aluminium, magnesium, boron and silicon. By the invention of what is known as the Castner process a new method came into existence. This consists in reducing either the hydrate or the carbonate of sodium in a fused state by means of "carbide" of iron or its equivalent, a mechanical mixture of carbon and iron so intimate that the two substances can be separated only by aid of acids, or intense heat. In the Minet process of producing aluminium, a mixture of the fluoride of aluminium and sodium together with the chloride of sodium is submitted to the influence of the electric current. On this, the sodium fluoride undergoes decomposition by the action of the electric current yielding up its sodium by interaction with the aluminium fluoride present, thus causing the liberation of an equivalent of aluminium and re-forming sodium fluoride. The metal, cast into the form of cakes, or ingots, is protected from the air by a coating of paraffin, and secured in closely-fitting soldered-up tinned-iron boxes, and in other ways.

From the foregoing it will be seen that sodium, like other chemical elements, may be derived from its compounds by the application of electricity; and, indeed, that was how it was first discovered. Then, it will be noticed that under certain circumstances on being introduced to water it causes violent explosions. If the presence of gas had not been ascertained to have existed in the street inspection boxes, and the insulators had a thick coating of the metal, minor explosions might well have been attributed to the explosive action of the sodium alone. We have no means of ascertaining the precise amount of the metal which was proved to occur, so it is difficult to form any definite opinion. No doubt, the Board of Trade will publish full particulars concerning that later on. Inquiry should, we think, be directed, in the first place, to the precise nature of the insulators. In the preparation of porcelain goods of a certain class it is customary to glaze the exterior by the application of common salt; the chloride might indirectly have provided some of the sodium in presence of a very powerful electric current. If dirt had been allowed to accumulate to any extent this also might have been partly responsible; the actual

composition of the electric mains themselves might show that adulteration had been at work; but these are mere suggestions which a careful enquiry would at once set at rest.

The Board of Trade has promised the Vestry to let them know, without delay, what to do to mitigate the evil, but that must, of course, depend on the success, or otherwise, of the investigations in progress. The Vestry Committee, by way of retort, it would almost seem, expressed a hope that the Government department would bring pressure to bear on the gas company to remedy the defective state of gas mains and services in their district, and thus remove the primary cause of the explosions.

CREWE INFECTIOUS DISEASES HOSPITAL COMPETITION.

AS stated in our last issue, the first premium in this competition has been awarded to Mr. George Bolshaw, of Southport, and the second to Mr. E. Harding Payne, of London, but, after inspecting the drawings, we cannot endorse the decision, as there are, in our opinion, several vital defects in the first premiated design.* The site is an irregularly shaped, approximately rectangular plot, about twice as long on the north and south sides as on the east and west. Roads are proposed on the west and south sides. The promoters have unwisely laid stress on the provision of space for future extension, although the site is really only sufficient for an infectious hospital of the size at present contemplated—that is, thirty beds—if due safeguards are to be observed. The first premiated design shows an apparent capability for future extension superior to any other, but this is only done by first ignoring the desirable rule of a non-infected zone 40 ft. wide around the site; and secondly, by making the long side of the wards face almost due south and north, instead of east and west. Thus the scarlet-fever block, although the main walls are 40 ft. from the road, has its small one-bed wards projecting till they are only 24 ft. from the road, whilst the typhoid block is within 30 ft. from the site boundary, and the observation wards are 4 ft. only from the boundary, and their offices 12 ft. from the road. After the recent discussion at the Institute, and the opinions then expressed by the leading experts in hospital construction, it is almost amusing to find that the author of the first premiated design is sanguine enough to hope that he can build an infectious hospital for thirty patients for 5,250*l.*, just half of the estimate of the second premiated competitor.

The sub-division of the thirty beds appears to have been left to the competitors, and Mr. Bolshaw provides for nine men and eleven women in his scarlet-fever block, four men and four women in his typhoid wards, and two beds in the observation wards. The plan of the scarlet-fever block is based on the now well-known arrangement, which gives one nurse's duty room overlooking four wards. The typhoid wards are, of course, simple enough, and generally there is little fault to be found with the detailed arrangement of the various buildings until we come to the laundry block, where we find the discharge rooms part of the same building and next to the infected van house. After leaving the discharge rooms, the cured patient in his own clothes must pass the scarlet-fever pavilion or the mortuary on his way out. The author provides 156 ft. superficial, 12 ft. lineal of wall, and 2,028 ft. cube to each patient in the large wards; 171 ft. superficial and 2,052 ft. cube in single bed wards; and 180 ft. superficial and 2,160 ft. cube in the observation wards. No covered ways are shown between blocks.

In the second premiated design a far better general arrangement is shown on the site plan, the buildings are sufficiently removed from the boundaries, the wards have the right aspect, and space is provided for future extension, but the author rightly advises that it should only be used on emergencies for a temporary or tent hospital. The accommodation is arranged for seven men and nine women in the scarlet-fever block, five men and seven women in the typhoid block, and two beds in the observation wards. The type of ward unit adopted is the same as in the first premiated design, and all the details are well arranged. The discharge rooms are rightly made a distinct block and near the entrance, so that after assuming his own clothes a patient would not be exposed to the chance of re-infection. The author suggests covered ways, but disconnects them where they cross, and thus effects a good compromise between the divergent views.

We have no hesitation in expressing our opinion that the Borough of Crewe would be more wisely served by the erection of the second than of the first premiated design. The land adjoining the proposed site belongs to the Corporation, and it would be greater economy in the long run to reserve additional land for future extension, instead of committing a serious present error, to be intensified in the future.

Of the remaining sixty-one designs there are many which show a sound knowledge of the requirements of an infectious hospital, and we regret that our space does not permit us to notice more than a very few. The design marked with "Red Maltese Cross in Circle," is one of the best submitted. No provision is made on the site for future extension, and thus the author has been able to produce a good general plan, and to give the right aspect to his wards.

Several competitors have endeavoured to overcome the disadvantages of the ward type adopted in both the premiated designs, as although this effects the desirable economy in a small hospital of making one duty room overlook four wards, there is the drawback that one patient in each of the larger wards is placed in a comparatively dark and badly ventilated corner, and, as we once heard an experienced hospital doctor express it, "these patients have a bad habit of popping off the hooks when one is not looking." "Light and Air Everywhere" provides two duty rooms for twelve patients in four wards in his detail of a good general plan. "Red Cross on Shield" has also a good general plan, but in his ward unit errs on the side of extravagance in sanitary adjuncts; thus the typhoid block, with twelve patients and one nurse's duty room, has five water-closets, five lavatories, and three bath-rooms. This competitor evidently takes the view, for which a good deal is to be said, that the nurse's place is not in the duty room but in the wards. "Xpert" has a good ward type, the duty room overlooking the two larger wards and the single bed wards being at the opposite end. "Hit" has a well-prepared set of drawings, but his arrangement is costly and even extravagant, as the thirty beds are provided in two wards of six beds, three of three beds and no less than seven single bed wards. We fail to see the advantage, too, of planning a three-bed ward with beds on the long side against a blank wall and windows only at the ends. The ward must be at least 36 ft. long, and the poor patient in the middle would surely come off badly for light and air.

* See, in connexion with this subject, the letter and report of the assessor in the competition, printed in our correspondence column.

NOTES.

THE result of the County Council election has been satisfactory. The inhabitants of London have shown that they desire efficient and economical administration within the existing powers of the Council. This is a thoroughly common-sense view, and exemplifies again the sound sense which characterises the Engtish people. Such conduct, for example, as a pedantic adherence to the principle of betterment, a short-sighted determination not to undertake improvements unless in exactly the way which seemed to the Council to be right, has been clearly condemned. Long debates on the unification of London again have seemed to the voters altogether unbusinesslike, as has such a thing as the painting of Hammersmith Bridge at an unsuitable season of the year, and, consequently, at a greater cost to the ratepayers, in order that some workmen might be employed in the dull season. On the other hand, the evenness of the two parties will prevent anything like a sacrifice of efficiency to economy. We do not for a moment believe that the ratepayers wish to avoid the spending of money if the object is business-like and to their interest, but they certainly desire to have the principle kept clearly and continuously in view, that the Council are trustees and agents for the whole body of inhabitants of London, and are not to sacrifice the general interest to that of some particular section.

THE Home Secretary last week introduced into the House of Commons an important Bill to amend the Factories and Workshops' Act. Without in anyway going into details we may point out that it extends the operation of the existing Act by including laundries and bakehouses, and, what is more important to many of our readers, "building operations where machinery is employed." We quote from the Home Secretary's speech, but the latter extension though, in some respects desirable, will require careful consideration so as not to be too irksome to employers. In some respects, perhaps, the most important alteration is the creation of a standard by which overcrowding in a factory may be judged. The Bill enacts that in every factory there shall be a minimum of 250 cubic feet of space to every person, and 400 cubic feet of space during overtime. In other words, not more than some half the persons who work in a factory in ordinary hours are to work during overtime. There are also various provisions as to fire escapes, fencing of machinery, and the non-employment of young persons in the cleaning of it, and other changes not unimportant but less noticeable than those which we have noted above. The Bill is undoubtedly a considerable advance on previous legislation, and it cannot be denied that though in some instances it will increase the burden already placed on employers of labour, yet that on the whole its provisions are such as cannot be objected to by reasonable men. When Mr. Asquith points out, for example, the unhealthiness of laundries, and the unduly long hours of labour in some of these places, we feel that this inclusion is a step in the right direction. The Bill is based on experience, and it is to be hoped that in the heat of party conflicts it may not be submerged during the course of the present session.

COMMERCIAL legislation frequently seems fated to fall to the ground after progressing a few stages, and in spite of several more or less energetic attempts to legislate upon trade disputes, we are still without a General Trades Conciliation Act. The introduction of Mr. Bryce's new Bill this week, marks another stage in the history of Parliamentary action with regard to this important question. The measure gives the Board of Trade a legal right to make inquiries into the causes of trade disputes, and to further facilitate the formation of Conciliation Boards. It is also proposed to empower Borough and County Councils to create District Boards, certain special powers being committed to such bodies in order to render their work effective. Arbitration does not figure very largely—indeed, it may be described as a cautious and somewhat unassuming measure. Mr. William Allan, M.P., in the course of the debate on the first reading of the Bill, boldly advocated the appointment of two "trade judges" to deal with trade disputes, but the Government are not likely to adopt this suggestion. If a good

workable measure can be framed with conciliation for the key-note, and an arrangement to fall back upon which would ensure the introduction of disputants to an approved arbitrator, it would certainly merit general support.

FOR the last two or three years the Mersey and Irwell Joint Committee has been doing its utmost to put a stop to the pollution of the rivers under its control. Numerous actions have been brought against manufacturers, local boards, and corporations, but progress has been slow. The parties interested appear, with one consent, to have thrown as many obstacles as they could in the way of the Committee, and the dilatoriness of the Local Government Board in holding inquiries, passing schemes, and granting borrowing powers, has added to the difficulties of the Committee's work. And now the work has received another check. The Joint Committee brought an action against the Salford Corporation for allowing solid or liquid sewage to enter the river Irwell and the Ship Canal. The action was really brought to prevent the further pollution of the Ship Canal, which, at the point in question, had taken the place of the river. Judge Parry, in delivering judgment, declared that the evidence of pollution was "overwhelming"; he had not, however, relied wholly on chemical or other evidence, but had seen and smelt for himself; he could not see (he added) how anyone, "not being a chemist and a witness" (!), smelling the smell and seeing the scene, could come to any conclusion but that the effluent was unwholesome, noxious, and polluting, and that it was liquid sewage matter within the meaning of Section 3 of the Rivers Pollution Act, 1876. And yet he was compelled to give judgment in favour of the offending Corporation, because the Canal was not a river within the meaning of the Act. To mark his disapprobation of the defendants' course of action, he ordered them to pay their own costs. We are glad to learn that the Joint Committee proposes to appeal against the decision, but it is to be hoped that the Lancashire County Council, which has an undoubted right of action in the matter, will at once take proceedings against the Corporation, so that residents along the banks of the Canal should not again have to breathe such pestiferous exhalations as characterised it last summer.

WE understand that a recently-formed limited liability company is about to work the Cove-Kirkpatrick Stone Quarries, Carlisle, on a large scale, and a few words on the matter may not be out of place. They are situated on the Cove estate, about a mile from Kirkpatrick station, Dumfriesshire, fourteen miles from Carlisle, and about two miles from the celebrated Corsehill quarries. The stone exploited is of two tints, red and yellowish-white; they are described as sandstones, though we have been unable to secure specimens for examination. From the following chemical analyses made some two months since on samples from which the hygroscopic moisture had been expelled, there is very little doubt of their being correctly designated, however:—

	Red stone.	Yellow stone.
Silica	83·516	86·113
Alumina	4·374	3·821
Peroxide of Iron	3·660	3·020
Lime	1·530	1·393
Magnesia	·412	·342
Potash, &c.	2·521	2·503
Water	1·274	·857
Carbonic acid	1·368	·466
Loss, &c.	1·345	1·485

It is of very little use to attempt an explanation of these analyses from a practical point of view, as they are not accompanied by a description of the mineral character of the stones as seen in thin sections under the microscope. Thus it is impossible for anyone to state how much of the silica exists in the form of sand grains or how far that oxide may act as a cementing material—points of much importance. Then, if the alumina is simply entering into the composition of felspathic matter we have no objection to seeing from 4 to 5 per cent. of it in these stones; but if, on the other hand, it is there in the form of clay, we should not think much of them. Without these two points being satisfactorily cleared up it is not possible to estimate the value of the analyses, any explanation of which must, to a large extent, be pure conjecture on the part of a chemist, without the aid of the petrologist. As they stand, the analyses might well refer to the chemical composition of two handfuls of quartzose sand. To a certain extent, however, some light is thrown on the matter by the experiments made as to thrusting stress, from which we observe that the light yellow stone crushed under a varying load of from 467·3 tons to 557·5 tons per square ft.; whilst the red stone crushed at from 418·6 tons to 461·4 tons per square ft. The range of variation is not great for this class of stone, and seems to indicate that the materials are of pretty even quality. These figures show that the Cove stones are quite as strong as those from the Corsehill quarries, which crush at from 341·6 tons to 579·6 tons per square ft.; and they are superior in this respect to many other well-known sandstones of approved durability. The value of these chemical and physical experiments would have been greatly enhanced had they been accompanied by detailed particulars as to the absorptive properties of the stones to which they refer. On the whole, so far as we are enabled to judge from the information laid before us, we should say that the Cove-Kirkpatrick stones are of very fair quality.

THE lecture on vaulting given on Monday by Mr. Arnold B. Mitchell at the meeting of the A.A. Camera Club was confined to the consideration of English vaulting, illustrated by lantern views, many being of considerable beauty and architectural value. A view of the Angel Choir of Lincoln, showing a near group of capitals and the distant vaulting to great advantage, was particularly successful. Exception might be taken to a greatly distorted view of the fan vaulting, King's College Chapel, which, though perhaps conducive to study of the vault, is scarcely to be recommended as a proper illustration of the subject. Of the other views it may be said they were carefully selected and superior to the usual professional photographer's series. It would have been better had some mention been made of French and Spanish vaulting. No illustration was given of either kind, though some interesting and complicated foreign examples might profitably have been introduced by way of contrast to English work, and as illustrative of the methods adopted by foreign architects, contemporary with the English, whose work Mr. Mitchell—properly in most instances—claims to be superior in thoughtful simplicity and continuity of purpose, That stone vaulting was, during the Norman period, the favourite method of ceiling is by no means disproved by the rarity of stone vaults of large span. The builders of Ely, for instance, certainly intended to so cover both nave and aisles; the abrupt finish of the shafts under the wooden ceiling clearly indicates this. The attempt in other cases also was abandoned owing to the insufficiency of the supporting walls, not from lack of skill in dealing with vaulting problems. The irregular surface of the filling in of Norman and Transitional vaults is due to the way in which the stones were packed together without centreing, or, at least, as Professor Willis says, with a very rude framework. A centre built up solid is by no means reconcilable with the usual appearance of this filling in. Mr. Mitchell claimed to have discovered that the latter method had been adopted at St. Bartholomew's the Great; but the point was hardly made clear. In the arcade of the Chapter House at Salisbury is a carving representing what may supposed to be the building of the Tower of Babel; from that Mr. Mitchell deduced that only such stones as could be carried by a man on his back were used in early vaulting, hence the smallness of the stones. We were pleased to hear Mr. Mitchell condemn the growing practice of putting faith in the architectural photograph, greatly, it is to be feared, to the neglect of the older faith in intelligent sketching and close study of detail.

MANY architects will have heard with regret of the death of Canon Venables (or, as he was often called, Precentor Venables), of Lincoln, who was an enthusiast in regard to Mediæval church architecture, and possessed a great deal of archæological knowledge in reference to monastic buildings. Members of the Architectural Association who can remember the first annual excursion to Lincoln and its neighbourhood, under the guidance of Edmund Sharpe, will not have forgotten the almost boyish enthusiasm with which Canon Venables joined in the proceedings. He was identified in sympathy with the Gothic revival and the church building movement of the earlier part of the century, and retained his old predilections and habits of thought about Mediæval architecture to the last. He was an occasional contributor to our columns, both in his own name and anonymously, the latter mainly in the form of accounts of some excursions of Archæological Societies at which he was present.

GLASGOW is noted for its theatre fires. There have been nine since 1829, besides three circus fires. The conflagration at the Theatre Royal on the 1st inst. was one of the most instructive, as it clearly showed how dangerous some concrete floors can be, and to what extent cast-iron columns, if properly set up, will resist high temperatures without being affected. The fire also showed to what a degree wood-work can become inflammable tinder in buildings of this kind. As to the concrete corridor floors, pugged wood would certainly have been safer. They could not be used for localising the fire in the auditorium, as they were too unreliable for the firemen to work on, or under. The difference of temperature and the falling of small weights easily wrecked them, though they were 7½ in. thick to an average span of about 6ft. 6in. As to the cast-iron supports, in several instances as many as three columns, bolted one over another and fixed to a good base, remained in position whilst everything around them was totally destroyed. The wood-work, of which there was too much in the building, burnt furiously and rapidly, the auditorium and stage being gutted in a marvellously short time. The wood-work was reduced to ashes in a way seldom seen at ordinary fires. The walls, which were of masonry, withstood the flames well, and will probably be re-used. As to the size of the building, which has already been burnt down in 1879, and then rebuilt by Mr. Phipps, we understand it to have seating capacity for nearly 3,000. The stage was 72 ft. by 50 ft., the proscenium opening 32 ft. On examining the plans, we think it fortunate the fire did not occur during a performance. We would only add a word of praise for Captain Paterson and his brigade. He handled them admirably, preventing any appreciable spread to the neighbouring property.

SINCE Robert Davidson propelled a car on the Edinburgh and Glasgow Railway by an electro-magnetic engine and galvanic batteries in 1837, wonderfully little progress has been made in the application of electricity to steam railways. It is only this year that electric locomotives seem to have got beyond their experimental stage. In France, the Compagnie de l'Ouest, after trials extending over nine months, have given orders to rent two Heilmann electric locomotives, which are to be of 1,500 h.-p. each, and capable of hauling 200 tons at a speed of 60 miles an hour. They are to be engined by Messrs. Willans & Robinson,

of Thames Ditton. The locomotive, described briefly, is made up of a steam-engine, dynamo, and motors, on a large truck, the dynamo and motors coming between the steam-engine and the axles. One of its recommendations is that all secondary vibrations due to the motion of the piston are absent, and so "pitching" and "galloping" are avoided. Still what it practically comes to is that the locomotive has to carry its own electric central station on its back, and it is very doubtful whether it will ever prove a formidable rival to our present locomotives. In America, the introduction of electric locomotives on the Baltimore and Ohio Railway at the Belt Line Tunnel seems to be the beginning of a new departure in railway engineering, and will be watched with interest by the general public. It is the first important step in the adoption of electricity on steam-roads. The railway motors are the largest in the world, and are designed for heavy work. In testing one of these motors, a New York Central heavy six-wheeled engine was coupled to the electric locomotive truck. The machines were then sent in opposite directions, and tugged at the connecting coupling as in a tug of war. The electric motor pulled the heavy locomotive up and down the track with apparent ease. One great advantage of these motors is that their pull is constant throughout, and so there is never any difficulty in starting. In ordinary steam locomotives there is, of course, a varying strength of pull due to the position of the crank. The Baltimore Belt Line Tunnel is expected to be opened by the beginning of April, and the operation of these heavy motors pulling trains through a tunnel, kept free from smoke, well ventilated and brilliantly lighted by electric lamps, has every chance of being a commercial success.

IT is satisfactory to find from the statement of the Chairman of the Metropolitan District Railway that the automatic station-indicator has proved to be capable of practical application, and that it is the intention of this company to begin forthwith to use it. There is no question that it will remove a great drawback to travelling on the underground lines, when it is often quite impossible to know in a carriage at what station the train is stopping. But it is equally clear that the use of the indicator should be made obligatory on all suburban lines, and we can see no reason why the Board of Trade, if it comes into general use in the carriages of the Metropolitan District Company, should not insist that it be used on other lines. It may, however, be fairly asked why improvements on the underground lines are to stop at the employment of a station-indicator. Why should not the stations be properly lighted and ventilated, the destinations of the trains be larger and more readable, and lighted so that they may be ascertainable in the stations at night or on dark days? In truth, a number of small improvements might be accomplished for the benefit of travellers on the underground lines, which seem to be entirely overlooked.

IN a communication to *Der Civilingenieur* Mr. A. Föppl gives some interesting particulars of the history of the truss. The modern truss, he says, originated about sixty years ago, and was due to two discoveries: first, that a rigid figure in the plane is produced by joining triangles together; secondly, that if a system of bars thus composed is loaded, there are mainly only tensile and compressive stresses in the bars. The triangulated systems of the Romans and Egyptians indicate that the first theorem was known in their days; but the introduction of members with bending stresses, different from those caused by rigid connexions, shows that the second theorem was not fully realised. The first trusses in the modern sense were the English and German roof-trusses, and the American bridge-truss. The theoretical definition of stresses began about 1839, and has been brought to a conclusion with the theories of the statically undetermined truss, by Mohr, and of the secondary stresses, by Manderla. The author states that improvements will be made, but there will be no more surprising discoveries; though there is still much room for improvement in the application of the above theorem to trusses which, as in the case of roofs or bridges, are two or more trusses braced together, but are generally treated as combinations of plane trusses. The paper deals with the investigations in this field of Schwedler, for uniform loads, and to his own subsequent work in solving the problem for irregular loads.

ST. THOMAS'S HOSPITAL (in respect of which an appeal for 100,000*l.* has recently been made to the public) was built in 1866-71, after the designs of Mr. Henry Currey, architect and surveyor to the Hospital Governors. The site, about 8½ acres, nearly one half of which had been reclaimed from the river fore-shore, was purchased from the late Metropolitan Board of Works for 90,000*l.* The governing body adopted the detached-pavilion system — extended on one line through the exigencies of the position, after a committee had visited many hospitals on the Continent. With a total frontage of 900 ft. the blocks stand 125 ft. apart: the central space being 200 ft. They were designed for 600 beds in wards measuring 28 ft. by 120 ft., and 15 ft. high, for 28 beds a-piece, giving each patient a space of 1,800 cubic feet. In giving evidence before the Hospitals Commission, February, 1891, Mr. Brass, receiver of the estates, is reported to have stated that the buildings on the Albert Embankment cost 969*l.* per bed, the out-patients' side included; and that whilst the London property then yielded 31,655*l.* per annum and was increasing in value, the income derived from country estates had fallen from 17,347*l.* a year, in 1880, to 14,000*l.* in 1890. But 296,000*l.* had been obtained for the site in the Borough, taken instead of St. Saviour's Church, in 1861, upon the award of Mr. Stewart, of Liverpool, in arbitration between the railway company (Charing Cross to London Bridge), who offered 145,000*l.*, and the Governors, who asked 478,000*l.* Until the Suppression this hospital, then valued at 266*l.* 17s. 6d. yearly, had been a religious foundation dedicated to St. Thomas of Canterbury. It originated in a house of charity which, with Amicius, Archdeacon of Surrey, for warden, was standing before 1213, within the precincts of St. Mary Overeye. After the great fire there in 1212 the canons opened on the east side of the Borough a temporary hospital to which Peter de Rupibus, Bishop of Winchester, joined a neighbouring almery founded for converts and poor children (1213) by Richard, Prior of Bermondsey. "Bekket's Spyttell," also called the Hospital of Holy Trinity, was given by Edward VI. on their petition "for poor impotent and lame persons" to the City Corporation, who re-named it, in 1553, as the Hospital of St. Thomas the Apostle. As rebuilt in 1707-8, and enlarged in 1717 and 1732, the three courts lay behind the north side of St. Thomas's-street, wherein the parish church and the treasurer's (former) house formed the south side of the middle court: the third court, Sir Robert Clayton's, stood on the old site. The north and south wings of the first court, entered from High-street, were built respectively with the donations of Thomas Guy and Thomas Frederick; the main entrance gates and lodges, with the two wings, were afterwards rebuilt of stone, from James Field's designs. Guy built his own hospital on a plot of land, south side of St. Thomas's-street, leased from the Governors of St. Thomas's, for 999 years at a ground-rent of 30*l.* per annum. Within the precincts of St. Thomas-in-the-Close, which was a sanctuary and formed the parish, lived James Nycolson, who there printed the first complete English Bible (Coverdale's); and also some renowned glass-painters, whom we mentioned in a "Note" of January 6 last year. We published Mr. Currey's designs in 1865 and 1871.*

THE Forty Hall estate, Middlesex, is placed in the market. The house, distant within a mile northwards from Enfield, was built in 1629-32, for Sir Nicholas Raynton, and reputedly after Inigo Jones's designs, which include the stable gates. In the church is the monument of Sir Nicholas, *obiit* 1646, with effigies of him and his wife. He is in armour, and wears his chain and robe as Lord Mayor of London, 1632-3. Raynton bought the old manor of Worcesters, *prius* Wroth's Place, and a neighbouring house which a survey of 1635 describes as some time Hugh Fortee's, but latterly Sir Thomas Gourney's. On the union of the two estates Forty Hall was regarded as the manor-house. The house he built was repaired and modernised by the Wolstenholmes in 1700. Eliab Breton married the heiress of the Raynton and Wolstenholme families. In 1787, two years after his death, the Enfield property, one of the most compact in the county, and comprising 1,800 acres of the ancient forest, was sold, by his son Harvey Breton, for 50,000*l.*, in several lots. A Mr. E. Armstrong bought the Hall and 159 acres, lying within a bend of the New River, for 8,800*l.*; they were afterwards purchased by Mr. James Meyer, who enlarged the estate to about 300 acres. Mr. Edward Ford, in his "History of Enfield," a privately-printed volume (1873), gives two good views of Forty Hall and the stable-gateway; he speaks of the beautiful traceried work in some of the ceilings, with the figures "1629," "1632" upon some of the bricks and leaden piping. According to a local tradition, it was in one of the walks at Forty Hall, alongside of the Maidenbridge brook, that Raleigh laid down his cloak beneath Elizabeth's feet. The Queen was then staying at Elsynge Hall, which Norden says was built by an Earl of Worcester. The old Manor-house of Enfield, long known as the Palace, where Elizabeth often resided, both before and after her accession, was alienated from the Crown by Charles I. His successor bestowed upon General Monk the Palace home-park, latterly known as Old Park.

"WOODS'" HOTEL, in Furnival's-inn, Holborn, has been demolished, the property having been acquired, we understand, by the Prudential Assurance Company from the Society of Lincoln's Inn by purchase. The demolition extends to three houses in Greville-street at the rear, and one in Leather-lane, to which latter street a part of the hotel buildings also have a frontage. The Inn and the hotel were built in 1818-9 by Henry Peto—whose statue (1830) is in the square—and in 1883-4 the hotel, of which Woods was proprietor during fifty years, was enlarged with additional rooms erected, after the designs of Messrs. Isaacs & Florence, on the site of two or three houses in Greville-street; three years afterwards the Assurance Company extended their premises by taking adjacent sites in Brooke- and Greville-streets: Mr. Alfred Waterhouse, R.A., being their architect. The old Inn, excepting its Hall, was pulled down and rebuilt *temp.* Charles I.; its Holborn front, of fine brickwork, with pilasters, has been attributed to Inigo Jones. The Hall, which remained until 1818, had over its door, facing south, a tablet inscribed "E P C 1688." Stow mentions a Sir William Furnival, Knt., as seized of two messuages and thirteen shops in Holborn, in 6 Ric. II. That property passed to Thomas Nevill, younger brother of Ralph, Earl of Westmoreland, on his marriage

* For some particulars of his plans we are indebted to a paper he read at a meeting of the Royal Institute, and printed in our columns on January 28, 1871.

with Joan, daughter of William, Lord Furnival. Their eldest daughter and co-heir, Maud, married the redoubtable Sir John Talbot who was summoned to Parliament in 1409 as "Johannes Talbot de Furnyvall," and was created, 1442, Earl of Shrewsbury. Their descendant, Francis, fifth Earl, sold it for 120*l.*, by a deed dated 16 Dec., 1 Ed. VI., to Edward Gryffyn, Solicitor-General, and others, "to the use of the Society of Lincoln's Inn"; but Herbert * tells us that Furnival's Inn is first noticed as a law seminary in its steward's account-book, written *circa* 9 Henr. IV., and that Lincoln's Inn granted a lease at 3*l.* 6s. 8d. yearly to the principal and fellows of Furnival's Inn. He also says:—

> The hall is seen on entering the gateway. . . . It is a low plain brick building, with a small turret, and two large projecting bow windows at the west end. . . . Its dimensions are 40 ft. by 24 ft. The roof is of timber, arched, and divided into pannels by ribs springing from the sides; but it is very plain and poor compared with others of a similar kind.

His volume contains plates of the hall interior and exterior, and of the main façade. Sir Thomas More was reader here for three years and longer. The arms of the Inn were, argent a bend between six martlets gules (Furnivall of Hertfordshire) within a border of the second. Charles Dickens lived for awhile at No. 12; the rooms he occupied for some period after his marriage, and where Thackeray called upon him with a proposal to illustrate "Pickwick," are at No. 15, on the third floor.

SOME of the members of the Cardiff, South Wales and Monmouthshire Architectural Society appear to have been engaging in a line of action which is very unprofessional and very discreditable to them. Mr. Seward, who is a leading architect in Cardiff, and was till a few weeks since President of the above-named Society, was commissioned by the Cardiff Corporation in 1890 to prepare plans for the extension of the Free Library, Museum, and Art Gallery, the original buildings of which had been erected by him in 1881, he having been appointed architect for them as the result of a competition. A delay of two years occurred, after which it was proposed to remove the Museum and Art Gallery to another site, a scheme which Mr. Seward approved of, but the library alone was proceeded with, and is now approaching completion from his designs, and it was understood that he would be commissioned to carry out the museum and art gallery whenever a fitting site was obtained. This has now been done, and Mr. Seward, at the request of the Corporation, had reported on the site and sketched some alternative plans, when the Society, of which till almost up to that moment he had been President, addressed to the Corporation a demand for a competition; in other words, to take the building out of the hands of the architect who had carried out all the other parts of the scheme, and had already been officially concerned in connexion with the new portion, and throw it open to them. Anything in worse taste can hardly be imagined. The matter seems now, from the Cardiff papers, to be in hot debate, and it is to be hoped that the Corporation will stand by their architect.

WE have seen better exhibitions of "the Painter-Etchers" than the one now open at the rooms of the Water-Colour Society, but it contains many things worth looking at, and it shows the usual contrasts between the free style proper to etching, and the elaborate working up which is rather to be called engraving. The proportion of these latter is, however, less than in some former years. Mr. Cameron and Mr. Short are admirable with their carefully-considered line sketches, especially the latter artist's "King's Lynn" (23). Mr. Holroyd's "Icarus" series shows a great deal of imaginative power. Some of the architectural subjects, such as Mr. Burgess' "Peterborough Cathedral" (92), suffer from being overworked, and in Mr. C. O. Murray's "Staircase, Christ Church, Oxford," the heavy treatment of the vaulting ribs makes them stand out with a kind of spider's-web appearance, the surfaces between them being entirely killed. Mr. Axel Haig is represented by several etchings; Mr. Goff's series are exceedingly good—etching of the right school, as also those of Mr. Crawford and Mr. Percy Robertson. Mr. Legros sends some works remarkable for their power and originality, notably "Ruine d'Ancien Aqueduc" (210), "Coin de Bois" (216), and "Le Triomphe de la Mort" (221).

THE collection of water-colour drawings of "Gardens of Many Lands," by Mr. Elgood, now on view at the Fine Art Society's Gallery, is charming almost from first to last, both for the merits of the drawings and the varied interest of the beautiful garden scenes represented. Among those that are specially good or interesting are "The End of the Terrace, Abbey-Leix" (8), "Amorini, Melbourne" (19); "The Terrace, Bulwick" (39), a broad green walk between a splendour of flowers; "The Gardens of the Alcazar" (57), with their curious-coloured tile panels in front of the seats; and "Rockingham Castle" (67), a delightful old rambling Late Gothic house flanking a garden fenced in by masses of clipped hedge as big as haystacks.

WE are glad (in a sense) to have learned that we did an unintentional injustice to our contemporary, the *Architect*, in referring the other day to an apparently consentaneous absence of reporters at a meeting of the Architectural Association, and that their representative was absent from unavoidable causes. Part of the paper read on the occasion, and published at first only in our own columns, was reprinted in the *Architect* last week with the author's concurrence.

THE ADVANCEMENT OF ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

WE see that all the tribes of the earth who have aggregated themselves into a nation, and have risen to a cerain pitch of civilization, have at their most flourishing time had an architecture of their own. This architecture has at least embodied their wants when their buildings were houses; and when public buildings were required, they were built in a larger, grander, and more ornate form: while their temples, which were to honour the deities they worshipped, were not only larger in size and of the best workmanship, but adorned with the highest ornamentation that was able to be produced. Temples and public buildings show the knowledge of the art of building such nations possessed, the shapes they liked, having regard to the materials they had to build with; while the ornamentation of their temples show the forms in nature that they admired. Some savages have a taste for modelling the animals they see about them, the Kaffirs, for example, and probably they include man. Men and animals would, therefore, probably adorn their temples, if they had any. If the people were imaginative they would probably endow the forces of nature with human or mythical forms; the sun would be their first and most benign deity, for from him they got light and warmth; the moon would be an inferior deity, who gave them light when the sun had sunk. Lightning, tempest, cold, hunger, disease and death would be evil deities, and other deities, both good and evil, would be created in accordance with the climate and the position of the country. The people who live on plains or table lands would know nothing of the sea, while the dwellers on the coast or small islands would worship and propitiate the sea; and the beasts, birds, fishes, and reptiles of prey would be different in shape and habits.

The beneficent forces might be shown in human form, or be compounded of the best man with the most useful animal, while the hurtful and destructive forces of nature might take wholly bestial forms, or be compounded of the mental picture of enemies and of predatory animals. The Greeks, who had brought the human body to its greatest perfection, by training, mostly invested the forces of nature with human form; in the jargon of the day, they are said to have had anthropomorphic tendencies. But even the Greeks made mythical figures as well, mostly compounded of men and animals, but sometimes of mixed animal forms alone; the first sort were winged human beings—centaurs, satyrs, sirens, gorgons, harpies, and men-dolphins; the second were winged horses, chimæras, and griffins, and some of these figured on their temples. Pictures are the first efforts of advanced savages to portray current or historical events; this portrayal rose into hieroglyphics and eventually into alphabetic or into sign writing. Even when aphabetic writing was known, the use of it was confined to a small and select class; and for the bulk of every nation it was by buildings, by pictures, and by sculpture that impressions had to be conveyed. Even to this day in England, where it may be said that everyone can read and write, certain events, and certain emotions are much more vividly conveyed by buildings, pictures, and sculpture, than by written or printed letters. You cannot convey form, colour, or bodily expression by words; still, there is all the vast realm of speech, of thought, and certain phases of mental emotion, that can only be expressed by words, and it is in the world of words that most people now live.

Not to speak of the architecture of the remote East, the Assyrians, the Egyptians, the Persians, the Indians, the Greeks, the Romans, the Saracens and the Mediævals, had each a distinct style of their own. Each of these separate styles is strongly marked, and could not readily be confounded with another style, until the art of forgery became popular. This cannot be said of Christendom now, for so small are the inventive powers of the moderns, and so humble are their desires, and so skilful are they in imitation, that they would rather adopt the style of a people scarcely emerged from barbarism, than endeavour to do anything of their own. In early times people could not copy even if they would; they could only gain a general impression of what they saw, and reproduce that impression. Even in Christendom young children cannot copy, though as they grow older their native powers are spoiled by being taught to copy. It is not to be supposed that men who could measure, draw, and model could not have copied, but they probably did not desire; they tried to seize the idea of anything that was useful or beautiful and to alter it to meet their own views and to make it their own. Plenty of cultivated Romans had seen Athens, and some confessed that they could not equal the Athenians in the arts and sciences. Virgil, for intance, says:—

> "Let others better mould the running mass
> Of metals, and inform the breathing brass,
> And soften into flesh a marble face;
> Plead better at the bar; describe the skies,
> And when the stars descend, and when they rise."
> (Dryden's "Virgil," *Æ.* 6, line 1,168-72.)

But they did not copy the buildings on the Acropolis; they despised the people they had conquered, and would not copy their works if they could; they wanted Roman architecture to be Roman; and in construction the Greeks were children to them. The Romans were absolutely destitute of original artistic invention in such a supreme fine art as architecture. Until the days of the Italian Renaissance no highly civilised people, to my knowledge, had such profound humility as to desire to literally copy any other people's work, even though it was better than anything they could do. As far as sculpture was concerned the Italian task was to try and rival or surpass the antique sculpture they found, whether that sculpture was Greek or Roman. Sculptors must determine whether the Italians did surpass it, but everyone must see that a new spirit animated it. I will only point to the helmeted figure seated in the Medici Chapel, whether that figure was intended for Giuliano de Medici, *il gran diavolo*, or for an embodiment of thought.

In architecture the aim was to reproduce the antique and to strictly adhere to the old Roman forms and proportions.

It has been stated that the Italian architects of the Renaissance intended to make architecture progressive when they had equalled the Romans, but found they could not. This is curious and well worthy of study, and, if possible, of elucida-

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* "Antiquities of the Inns of Court and Chancery." By W. Herbert. 1804. 4to.

* Being the sixth Royal Academy Lecture on Architecture this Session. Delivered on Thursday evening, February 14, 1895.

tion. Renaissance architecture had begun in Italy while Gothic was in full force in the West, and the increasing taste for the new Italian architecture forced the Western architects to effect a compromise between Roman and Gothic. The style thus produced was very charming, but was not destined to be progressive. The historic castles of France are the main examples. It was long believed that the Gothic architects of France handed over their constructions to Italian architects to be Romanised; but the late lamented Léon Palustre conclusively showed that this hybrid style was purely due to French architects. He has furnished us with the names of hundreds of French architects most of whom were before unknown. We should like to know the course of study they pursued, but probably our desires are doomed to disappointment.

The admirers and imitators of Gothic have often proposed that the profession should master this style, and start a new one on its basis, the only question being whether the starting-point should be the last period of Gothic, or the period when it had reached its greatest vitality and vigour. Hitherto the scheme has produced as little effect as the Renaissance one. I think this is not to be wondered at, for if the Gothic architects of the West could not succeed, how can we hope to? These artists had the current Gothic construction at their fingers' ends, and their construction in stone was the best then to be had in Europe, while society then wanted its aspirations embodied in buildings, and had a passion for gorgeousness and magnificence. Let us contrast the attainments and desires of the middle of the fifteenth century with those of the end of the nineteenth, and take them in the same order. Assuming that the present architects have the same skill in construction as the Gothic ones, is stone the best material that can be used for an advance in construction? No, iron is. Is the skill of the architects in construction the greatest that can be found? No, it is like comparing an ordinary walker with him who had on the seven-league boots.

Sixty-five ft. was about the span of the greatest Gothic vault. Sir B. Baker's Forth Bridge has a span of 1,700 ft. Does society desire to have its aspirations embodied in buildings? No, it wants its highest aspirations embodied in an Act of Parliament. Has society a passion for gorgeousness and magnificence? No, it is quite content with ugliness and meanness, if consistent with luxurious comfort. And these are by no means the only causes; how could the Renaissance architects advance while they were dealing with the expression of the skill, knowledge, and taste of a people different from themselves, and were bound to adopt the recipes left by the Romans? It is not strange that the hybrid produced from Gothic and Roman was sterile, when the Gothic architects were trying to graft on to their own native expression that of another people with the whole order of whose thoughts they were not familiar. No one can wholly remove himself from the influences of his surroundings, so we may look on any attempt to make Gothic progress as inevitably hopeless. The stealing of birch-brooms ready made is not the training wanted to get skilful broom-makers.

I said that I believed that no highly cultivated people before the Renaissance literally copied, but I believe Egyptian architecture was copied or paraphrased in Egypt during the sway of the Greeks and Romans. Archæologists alone can tell whether the temples then built were executed by Greek or Roman architects. It looks to me as if the rulers, who naturally wanted to be popular, were aware of the intense conservatism of the Egyptians, especially in religious matters, and for this reason gave the temples to be designed by native architects in the native style. Supposing the Temple of Isis in the grounds of Hadrian's Villa was a copy of an Egyptian temple, it was only for a sort of masquerading business to amuse him and his visitors in their idle hours, just as some great man over here might have an American Indian wigwam or a Gothic summer-house in his garden, to amuse the ladies.

The desire to imitate Roman buildings rapidly spread from Italy to the farthest limit of Christendom, but out of Italy the desire was rather to Romanise every building than to copy Roman monuments; but it eventually led to the introduction of nearly pure copies of Roman work, and at last it became disgraceful not to copy.

You may see this view taken so late as the latter half of the last century, by Milizia, who wrote the lives of celebrated architects, and who only died in 1798, long after the imitation of Greek and Gothic had sprung up; Horace Walpole died only a year before him.

Though the imitation of Roman and Renaissance architecture is going out of fashion, imitation is still looked upon with the greatest admiration and respect. Gothic, except for its construction, which is far behind our own in iron, is inferior in grace and proportion to what can be now done, and the same may be said with still greater emphasis about Gothic sculpture and painting.

It is no use using hard words about imitation, if there be nothing of our own to take its place. To say, do not imitate Roman, only lays us open to Tom Sheridan's retort to his father, when he advised him to take a wife:—"Yes, sir, whose wife shall I take?" If we could be sure that there would never be any high aspirations again, or that their embodiment was to be in an Act of Parliament, or if the reason of architecture not progressing was not from a wrong method being adopted, but from a natural imbecility of mind, I should say to the architectural students, turn engineers, or devote yourselves to drains, warming, ventilation, and the price of bricks, as there can be no doubt that all people are deeply interested in these subjects; but to ask you to relinquish your aspirations for expressing the thoughts, culture, impulses, and ideas of the day for pelf, would be like asking the great poet of the day to avoid high subjects, and to try his hand at a new rhyming pence table.

When imitation Gothic was rampant, architects, image makers, ornamentalists, and painters, started schools to teach mechanics how to imitate Gothic carving and painting. The real Gothic image makers and painters did their work as well as they knew how; they went so far as to draw from the nude. M. Jusserand in his "Literary Life of the English People," gives an extract from the Chronicles of the Abbey at Meaux, near Beverley, in which it is stated that the Abbot, Hugh of Leven (1339-1349), having ordered a new crucifix for the chapel of the convent, the artist "had constantly before his eyes a nude man, and he tried to give to the crucifix the beauty of form of the model." Here in the fourteenth century, we see the artist trying to do his best, and going the right way to work; in the nineteenth century we see him purposely trying to do his worst; there is no hope for him, nor for those who encourage him in learning to forge. If there is to be progress we must avoid conscious follies, and not only do our best, but encourage others to do it.

Looking at the achievements of Christendom during the last century and a half, in other directions, it would seem incredible that the Christian world was struck with imbecility in this, and could not proceed a single step towards the improvement of a progressive art like architecture. We live, it is true, in a world of words; the foremost men are engaged in unravelling the secrets of nature or the past, or in making machines to apply the forces of nature for common use. The things wanting are a comprehension of the supreme importance of the visual fine arts and a sense of the beauty of form; this last is one of nature's gifts to man, for his solace, his purification and delight, but it is withering away, if not withered, from want of use; and if we do not mind, the asking for beauty of form in buildings will be shortly like expecting the apterix to fly. The art of sculpture would be extinct if it were not for a demand for the effigies of deceased persons and municipal busts. There is a considerable taste for colour, for people buy pictures for large prices. Some people say pictures are only bought because they are a better investment than a lead mine; but, if the taste were decreasing instead of increasing pictures would not sell for double, but for half their original cost. Never perhaps before was the word "Art" in so many people's mouths, and so often in print, but if distinction in form be a part of it, then I think that if those who pretend to love art were to speak what they feel they would ask what it meant, just as Napoleon's Staff in Palestine asked why it was called the Holy Land.

I am not one of those who deplore the use of machinery; it has made the necessaries of life much cheaper, as well as those things that have almost become necessaries to us; but, as a French wit said, the invention of the *lift* is useful and shows great ingenuity, but supposing a man spent his whole life among *lifts*, would he be wiser, better or happier? Some very clever architects have said, if there is to be a new style, you must wait for another irruption of barbarians, but Byzantine did not owe its development to such a cause, nor did Gothic, but before there is a chance of a new style there must be a long period of systematic teaching, and a long series of buildings with a structural or an æsthetic want to be satisfied. It was two hundred years at least between the foundation of architectural schools by Constantine to the building of Sta. Sophia; doubtless there was some sort of architectural instruction in the English Abbeys from an early date, but the abbeys were liable to all the incidents of war until the barbarians had settled down. The Norman Conquest was in 1066, and it was not till near 1200 that Gothic emerged. I should be a prophet if I could tell you whether a development would take place, and in what direction, and could give you a recipe for hastening its advent. I only think there may be, because of the advance in knowledge, skill, and enthusiasm of the architectural students, and an undoubted desire to see something characteristic of our age, instead of a chaos of paraphrases. We can see all the phases of each particular style of the past with no more trouble than turning over the illustrations of a book, but it must have taken a long time between the first and last step of each epoch. For example, from the time when the first Greek carpenter rounded the headpiece on a tree trunk supporting a bressummer, and gave a nick with his axe at the bottom to make it effective, until the Ionic capital came to perfection as a shell spiral at the Erechtheum; and that carpenter certainly never dreamed of what his inventon would lead to. So it was with Gothic. The first architects who used the light pointed arches, vaults, and lancet windows, did not see it ending in Rheims, Beauvais, St. Urbain, or St. Wulfran; neither the moslem architect who designed the cusps for the Mosque at Cordova, nor he who put the stalactites to the well-house at the Mosque of Ahmed-Ibn-Tulun, foresaw the Mosque of Sultan Hassan, nor the Alhambra. In the cases I have mentioned, the architects must have been ready to seize an idea and improve on it, and those for whom the work was done must have admired it; for it is clear that if it was not liked, people would not have had it done twice. To solve the problem of how to make people care for architecture one must know the cure for the deaf adder, and that cure seems rather to point to the will of the reptile than to a physical infirmity. It has occurred to me that something might possibly be done in this way; if a promising younger son of one of the nobility or gentry showed any admiration for the works of the visual fine arts, he might, after he had taken his degree, spend five years in an architect's office, three years in a sculptor's, and three years in a painter's studio. He probably would not become an architect, a sculptor, nor a painter, but he would learn what these arts meant, and would probably hear from his fellow students their aims and aspirations. Government have the ordering of a good many important buildings, and some statues, and it could have striking historical events painted. If this young nobleman or gentleman were made a Fine Art Minister, he would probably try and get such works done, and done well, and would explain to the House and to the people their importance.

I do not grudge the 75,000*l.* paid for the Amedei Raphael; it brings us credit, and helps to bring us visitors; but that sum would have gone a long way towards completing the historic pictures in the Houses of Parliament, or of decorating with pictures any of our public buildings. A grant was asked for in the House for completing the mosaic pictures in the octagon, and would have been carried, had not someone suggested that we should wait for an English Titian. When I was a schoolboy, there was a sort of Greek Joe Miller, called Scholastikos; he was nearly drowned, and vowed he would never go into the water until he could swim. He was as likely to become a fine swimmer as we are to get a Titian, if no public painting is done. Greece and Rome were once teeming with wealth and population, and were the centres of attraction in the world, but you might as well ask, Where are last year's snows? as, What has become of all their population, industry, wealth, honour, and glory? What is the residuum of it all? A few poems, a few pieces of oratory, a little moral philosophy, a few statues and bas-reliefs, a few lovely engraved gems and a few coins, a few sublime buildings, and many ruins. The essence that is extracted from the toil, the striving, the happiness, and the misery of the millions of our countrymen, can only be the possession of remote posterity, if this essence be enshrined in sublime works of art; and it is for the architects to strive to endow their buildings with that sublimity that ever keeps young.

Beyond the fine arts, we may say that the names of some lawgivers, some great discoverers of the laws of nature, and some conquerors may

survive, but we must not forget that verse of Horace's song to Lollius :—

"Many, many have lived, who were valiant in fight,
Before Agamemnon ; but all have gone down,
Unwept and unknown, in the darkness of night,
For lack of a poet to hymn their renown."
(Book 4, Ode 9, l. 25,
Sir Theodore Martin's translation.)

The late John Addington Symonds put the conditions of immortality into a maxim, "Nothing is imperishable but high thought, to which art has communicated the indestructible form of beauty." What sums up Ancient Egypt? the Pyramids, the Sphinx, and its buildings. What sums up the Middle Ages? Dante's Divine Comedy, Boccaccio's Stories, and its cathedrals, its abbey churches, and its fortifications.

Let us now look at the conditions and circumstances immediately preceding the development of Byzantine architecture. It arose after there had been a great constructional advance in Diocletian's reign, who died in 313 A.D.; there was a perfect fervour in building when Constantine transferred the capital to Byzantium in 330, and he had greatly stirred both his Pagan and Christian subjects by granting the right of public worship to the Christians. He started schools of architecture in Italy and north-west Africa, and had not only offered free youths of liberal education a premium for studying architecture, but had offered inducements to skilled artificers to settle at the new capital, and to bring up their sons to their own trades. Some 200 years after Constantine's death, Sta. Sophia was begun, which was marked, not only by constructive daring, but by novelty in its floral ornament. To turn to Saracenic, the Hegira was in 622; towards the end of the eighth century, Abd-el-Rahman built the mosque at Cordova, and it is believed that the foiling of arches there was taken from North India. We are, however, in perfect darkness about Moslem dates. Ahmed-Ibn-Tulun died about 868 A.D., and his mosque was built by a Copt, or Egyptian Christian, and has nothing Saracenic about it but the plan; but the well-house in its court has stalactites. Some think this was built shortly after Tulun's death. These stalactites, we presume, took the people, for they flourished, and soon became one of the characteristic features of Moslem architecture. The treatment of them varied, but towards refinement and complexity, until they culminated at the Alhambra, and were not only used as cornices, but for the capitals of columns and for corbels, and eventually were used to fill the interiors of cupolas. The geometric surface patterns or mazes were sometimes left plain, and sometimes filled in with floral forms, and texts from the Koran were also used as ornament. It is curious that these Saracenic patterns were used for all the ceilings of the late Gothic churches in Madeira and the Canary Islands.

In Richard Cœur de Lion's reign, who was crowned in 1189 and died in 1199, Gothic is supposed to have begun, Romanesque had arrived at considerable excellence both here and in other parts of Europe, in fact, grander internal effects were produced by it than were ever attained by Gothic, but it was ruder in execution, less scientific in construction, and infinitely less skilful in its mouldings. The victories over the Saracens and the triumphs of the Cross no doubt, stimulated the minds of the people at home, while vast multitudes had travelled through Europe, Asia Minor, and Syria, and intercourse with the East had become much greater after Jerusalem was in the hands of the Christians. It is most probable that architects, as military engineers, had seen most of the architectural masterpieces of Europe and Asia; for we must remember that Vitruvius was an inspector of artillery, and Anthemius of Tralles a military engineer. I suppose, too, that the Saracens were then the most advanced people in the world—at any rate, if in some respects they were less advanced than the Romans of Byzantium, they were a more courageous and energetic race. The study of philosophy, geometry, and mathematics had been pursued by the Saracens with great devotion. Averrhoes, who commented on Aristotle, died only a year before Richard I., and we must recollect that David Hume said where there are no philosophers and metaphysicians we cannot expect to see good weavers, carpenters, and shipwrights.

As I have said before, Europe during the Middle Ages was saturated with Saracen lore. One of the intellectual passions of the Saracens was the study of geometry. The Saracens not only loved geometry, but found out that patterns made from polygons had a certain beauty and mystery about them, their greatest fault in our eyes is that they seem to wink, and they covered everything with these geometrical patterns—panels, flat and curved surfaces of buildings, their furniture, arms, and utensils—frequently interspersing bands of texts in ornamental writing with the patterns. Only heretical shiahs would draw man or animals, so that the active minds of the orthodox were driven to these geometric puzzles, the solution of which have only been found out within this century. The Gothic architects and workmen got bitten with this geometrical passion. What influence the Saracen servants in England and our Saracen colony had in fostering this geometric study we know not.

In the present day, if a joiner or cabinetmaker has to mitre elaborate mouldings, he works them on the straight, and cuts them by a mitre-box; but this could not be readily done in the case of a stone skewback, or at least was not done; the complicated Gothic mouldings were projected on to the splay of the skewback and worked by the chisel. This shows great accuracy in projecting and in working; for you must remember that all Gothic stonework was worked before it was set. So proud of this skill were architects and workmen, that interpenetrating mouldings became the fashion.

There are two points to be observed in this peculiar state of things; one is the rapid progress made in the elaboration of each idea, and the other is the hold every new turn took on the public mind. I hope you will excuse me if I am a little long, but I have not had that affluence of time to arrive at conciseness.

The Romanesque aimed at impressiveness by size, and by striking forms—see the pillars of Durham and elsewhere, with their chevronned or spirally ornamented shafts, the great round arches, the big mouldings, and zig-zag ornament. When Gothic came in, though the arches were pointed, all parts were quite as simple, perhaps even simpler, than in the Norman; the windows were lancets, and subsequently in doublets, with a column between and a hole in the spandrels; then came the suppression of the column between the doublets, and the turning of the whole head into cusped tracery, and gradually everything simple, and everything solid seemed to melt away, and there was nothing left but pierced work, be-cusped and be-crocketted, and eventually ceilings and archways ran into pendants, and mouldings interpenetrated. We may be sure that these pendants and this fretted work took the fancy of the people, from their continuance in the work of Elizabeth's and James I 's time, when they were no longer constructional but purely ornamental additions. The elder Teulon built a church at North Woolwich, and substituted pierced work of floral forms, as a heaven-sent relief from the ubiquitous cusp, but it seems to have taken no one's fancy, and there remains, an almost isolated example. It was original and pretty, and if it had been greatly admired, it would have been a new motive to be gradually brought to perfection. So I think we may safely say, that the want of progress is due rather to the apathy of the public than to the want of invention.

I think it will be generally admitted that at the present time there is no traditional style of architecture in England; the imitation Roman of the Renaissance began to die out in the time of Wren's successors, and died about the time Marylebone Church was built, for then almost all buildings of importance began to be paraphrases of Greek architecture. There was, too, a revival of Gothic, and the revivalists certainly wrested all the church building from the Renaissance and Anglo-Grecian architects; it is not quite exact to say *all* the churches, but the exceptions were trivial; and owing to the passionate literary advocacy Gothic received, it secured for itself such important public buildings in London as the Houses of Parliament, the Albert Memorial, and the Law Courts. Subsequently all the hybrids begotten of Classic and Gothic from every country in Europe have been and are still being tried.

Travelling has enormously increased, and most of the architectural students and young architects have seen at least half Europe, and photographs of most of the architecture of the world are common. It is difficult to say whether the emulation stirred by seeing the masterpieces of other nations and other times has been the motive for the advance of architecture, or whether it has been from the activity of mind created by travel; but the two great modern styles, Saracenic and Gothic, sprang into existence after the Moslems and Christians had seen the greater part of the architecture of the world. Shortly before the Saracen invasion, in the seventh century, the Saracens did not appear to be able to build at all, and it seems not to have been till the tenth century that those features that particularly mark the style appeared, took root, and began to flourish; and not only were these peculiarities, the stalactites, the geometrical patterns, and the ornamental writing, pushed to the greatest extent, but a mastery of form and composition was gained by the architects; for the later work points to a highly cultivated taste.

It was not till the Third Crusade, in the days of Richard I. and Philip Augustus, that Gothic emerged. The extraordinary rapidity with which the improvements in construction and in æsthetics proceeded is amazing, so that St. Urbain at Troyes might be taken for a work of the latter part of the fourteenth century instead of being completed in the thirteenth; this shows that the architects had a firm grip of the requisite skill and knowledge to carry out the vast and wondrous buildings called for, and to improve as they went on. When R. Stephenson thought a large, tallboy might be used for the Britannia tube, very little was known about wrought-iron; experiments were made at the expense of the Chester and Holyhead Railway Company; and the mathematical attainments of Hodgkinson, the practical knowledge of Fairbairn, and the attainments and inventiveness of all the engineers of the railway, of Ross, Forster, Edwin Clarke, Campbell, J. Wyld, and others, were put into requisition and were directed to these experiments. Eventually a width of nearly 500 ft. was spanned successfully by a wrought-iron box; this was then a marvellous feat. Some forty years after its completion the Forth Bridge of 1,700-ft. span was successfully made without causing any particular astonishment in the public, or its great engineer being looked on as one of the wonderful men of the world.

The architects are, or ought to be, the poets who proclaim the greatness of the achievements and the discovered wonders of this age, only their language is expressed in brick, in stone, in marble, or in metal.

The capturing of some of the forces of Nature has given us swiftness and light, power and wealth, so that the whole of mankind are not only more numerous, but better fed, better clothed, better lighted, better taught, better physicked, and better healed, than it ever was before.

It is thought a highly imaginative episode in "The Arabian Nights" when we are told that Solomon put the rebellious spirits of the air into bottles of brass and sealed them with his seal, but the spirits of steam and electricity were rebellious to men, and we have now confined them in vessels of iron, and, more wisely than Solomon who threw them into the sea, have made them work for us. Some day mankind will want to celebrate all these achievements over the forces of Nature, and will ask the architects to embody them in buildings. What I have striven to do is to stimulate you to get as firm a grip of the means of emotional building as the engineers have of the practical in iron; so that when mankind again turn their attention to architecture, those happy accidents that gave the flavour to Saracenic and Gothic may be seized on by the architects and brought to perfection. I have often pointed out the studies of the poets to perfect their language, and to learn the methods of producing emotions; these studies are the reading, the paraphrasing, and the analysing, of all the poetry that existed up to their time, with the efforts they make to express their own emotions equally well. As far as I can see, when you have mastered construction, there are no other means but these to learn the emotional possibilities of building. Speaking roughly, the students are too often wofully deficient in a knowledge of plain and solid geometry and of statics; they pay but small attention to lighting, even of the practical sort, and scarcely ever attempt the emotional. I once saw a new church, the nave of which was roofed, but the aisles had only the rafters on, so the nave was dark and the aisles were brilliantly lit; the effect was both excellent and striking, but the architect laughed at me when I advised him to keep to this effect. Viollet-le-Duc said, if we might make a concentrated definition like Buffon's "the style is the man," we might say that "moulding is architecture"; if so, we have none, for mouldings are in the antiquarian chrysalid state. An architect's mouldings are approved if they belong to the architectural epoch he imitates, so that in spite of differences in taste and in climate, Greek, Roman, Saracenic, or Gothic mouldings are looked on as equally good and appropriate for us and for our climate. Mouldings should, of course, be made logical as to sequence of forms, graceful in section in accordance with the highest taste of the day, and effective for their end, by being made suitable to the

climate. The proportions of buildings and the shape of their parts are fairly good from an antiquarian's point of view, though in the bulk of modern architecture not so good as they should be; but to progress we must vary both, so as to convey the character and emotion we want conveyed. There is now an attempt amongst a few to do this. We cannot reasonably expect that new proportions and new shapes will at first rival in excellence the forms and proportions that have been perfected by centuries of trial; all we can expect is the absence of contortion and vulgarity, if the emotions wanted are produced. We want also to enlist the efforts of the ornamentalist, the sculptor, and the painter in the same direction; at least if we are ever to have a completed architecture that will rival, must less distance, the past. All the vegetable and floral forms of nature are not comprised in the lotus, the honeysuckle, the waterleaf, and the acanthus, though it probably took several hundred years to perfect these native forms, and make them harmonise with fine architecture and adorn it. Natural leaves and flowers roughly copied and applied are poor in the extreme as compared with fine architecture; for leaves and flowers have a very different object than that of adorning architecture. We can hardly hope to equal the egg and tongue, or the waterleaf of the Greeks, but we can and do hope that people may one day begin to love some flower; a dog-rose, a daisy, a buttercup, a violet, a frittilary, or a dandelion. If we could find people loving these things that they can neither eat nor make money of, and desiring to have them on their buildings on account of their beauty, our ornamentalists, who are fairly skilful, would be able to adapt them for architectural ornaments.

Architecture is essentially of the time in which it is built, for it is wanted at that time for some material or emotional need; the arts that help to adorn it would have a more powerful effect if they could represent the present too, but in the case of sculpture or painting that is impossible, because it restricts the artists to animals and the Sandwich Islanders. They have to go back to Greek times to show the beauty of mankind; for hat-makers' blocks, tailors' dummies, and shoemakers' lasts, even with a man's face thrown in, are either contemptible or ludicrous.

There is not much time left to endow the nineteenth century with any architecture characteristic of it, but that is a more cogent reason for devotion and effort. Architecture never dies, except when man relapses into savagery, and if we cannot perfect our architecture in this century, I do not know a nobler aspiration than helping the twentieth century to have an architecture of its own. Thought and science have had their martyrs, and, partly through those martyrs, thought and science now flourish beyond any other high efforts of man. The martyrdom of the best or the worst architect is hardly likely to extend to the rack, the cross, the stake, or the gallows. The utmost that is likely to happen to the best or worst of us is starvation or oblivion; but I feel sure that you who have declared your allegiance to this sublime master art, will refuse to be deterred by these grisly spectres from doing your best to help it to rise to a height that the world has not yet seen.

THE ARCHITECTURAL ASSOCIATION.

THE ordinary fortnightly meeting of the Architectural Association took place on the 1st inst., in the meeting-room of the Royal Institute of British Architects, 9, Conduit-street, Mr. A. Beresford Pite, Vice-President, in the chair.

A vote of thanks was accorded to Mr. E. A. Runtz for allowing the members to inspect the new Pavilion Theatre, Whitechapel-road, and for entertaining them afterwards.

Messrs. P. W. Meredith and J. W. Abraham were elected Members of the Association.

Mr. T. Stirling Lee then gave an address on "The Use of Sculptural Decoration at the Present Time." Mr. Lee said that when they looked at a great deal of the carving on buildings, they saw that it was the very worst part of the work, and if such fearful execution was put into the joinery or any other part of the building, it would be condemned at once. The mouldings would often be found to be good, but when they came to the capitals the whole thing went "right into a hole," or as Mr. Pomeroy would put it, it was beautifully carved, just like iron, the caps being out of key, and the whole thing cut up. He, therefore, desired, first, to speak about the use of sculpture. A visit to the British Museum would show that it had a use. The ancients had something to express, and they, so to speak, put the reason of their buildings into figurative and symbolical language. In the remote ages, and even before they had tools, people took a flint and a bone and drew forms. Why, then, did these people actually draw animals and other objects, and why did boys at the present time naturally take to carving? It was because they had in their brains the faculty of form, and that they would use it. The question then was how they should use that faculty which they possessed? He would like to consider such a building as St. George's Hall, Liverpool. Some forty years after that building was erected, the authorities advertised for sculpture to complete the work, and a plan was sent round to all the sculptors. It struck him as being a magnificent opportunity, and he set to work quite as enthusiastically as Elmes did in the first instance. The building was principally an Assize Court, and Justice was the thing which should be written on its walls. Three sketches were sent, and four smaller ones; and afterwards, when they came to look at the thing carefully, they found that the whole should as far as possible be a frieze. Having decided that, they had to alter the subject, and it was found that the figures would have to be erect, and that on the pedestals above suitable statues should be placed. The question then was as to the necessary relief that would be required, and that was a matter entirely guided by the surrounding members and mouldings. The actual light and shade of the mouldings had to be carried through on the key-note of the light and shade and depth and relief of each panel, and these lines had to be joined and tied in every one of them. He first worked in clay, and to get the clay treatment he had to make the lines perpendicular, stiff and straight. In England one had to consider the soot shades, which exaggerated the treatment. The first thing to do was to put the thing further back, so that the mouldings acted as shelters. In working clay it should be remembered that they were building up the whole of the time, while it was just the opposite with stone, in which case they had to work down. He therefore had a mass of plaster made just the necessary height, and drew his work upon it, as he would on stone, carving the lines direct. [Two panels were shown, exhibiting the difference in the result, between building up plaster from the ground, and working down into it from the surface.] In reference to this point he would remark that the Greeks had a wonderful knowledge of the effects of light and shade, as could be seen in the case of the Parthenon frieze. [As an instance of this Mr. Lee drew attention to the incident of the slightly higher relief given, in the Parthenon frieze, to a figure near the angle, so as to strengthen and accentuate the effect at the angle.] People were now beginning to recognise that they could decorate their houses without pictures, and many sculptors were entrusted with that most charming opportunity, a chimney-piece. Architects who were designing a house which would contain such a feature as a chimney-piece, should consider if it would look well. Such a feature might be a piece of beautiful sculpture, but the effect would be poor if it was not well lit. In fact, it was a complete waste of money to put good work where there was bad light. Where there was a fine chimney-piece, no other sculpture was required, and in placing decorative work of that description in a house, they should carefully consider how it was to be seen.

Mr. F. T. W. Goldsmith, Senior Hon. Sec., then read a communication from Mr. W. Young on the subject, in the course of which the writer said: The subject of the use of sculpture in architecture is a most interesting one, and one which I have done my best to promote, not only in talking and writing, but in actual work—because I believe in it. Sculpture in building, has, in my opinion, been too much neglected, and ornament has been overdone. One would rather see in a building a small amount of really good sculpture, than a large amount of ornamental work. At the same time, one must not forget that sculpture on any great scale can only be done on public or monumental buildings; in domestic work, it is not likely to hold a large place. I think it is the place of the architect to produce sculpture in place of ornament whenever he has the opportunity, or rather he should try and make the opportunity. The question of cost is undoubtedly a difficult one to overcome, but I think if we, when the opportunity of using sculpture occurs, put clearly and forcibly before our clients the difference in result and value between sculpture and ornament, this difficulty may be overcome; at least, such has been my experience. But, granted the opportunity to employ sculpture, which is the grandest decorative aid to architectural design, we must take care that it is not merely figure-carving in stone, but sculpture of the highest class, which we must aim at. In my opinion, sculpture in architectural work brings out the highest qualities of the artist. There he deals with its conception, with its composition, with its proportions, without going into the elaboration of too much detail. For sculpture in architecture should, first of all, be broad and very simple. It is also necessary that it should be to a scale, both in size and relief, proportionate to the place in the building which it occupies. One has seen in many of the recent efforts to adopt sculpture in buildings, figures of such a small size, and so out of proportion to surrounding work, that they look like toy figures, only fit for the Lowther Arcade, and forming no part of the architectural scheme. Not only should the scale be proportionate to the building, but it should not be any random figure, stuck in in any place, but the whole should be part of a scheme both in subject, in size, in treatment, and in relief, so as to form a harmonious part of the building which the sculpture decorates. I am afraid that in the present day, with a growing tendency to produce sculpture in buildings, we shall get, as we have in other things, a cheap and shoddy sculpture. If we employ sculpture at all, we should take care that it is of the very best. It should be sculptor's sculpture, and not stonemason's sculpture. I had an example of this a little time ago, when a man was introduced to me who offered to execute a 7-ft. statue in stone for one of my buildings for something like 30*l.* I happened to have seen some of the man's work, and in reply, while thanking him for his kind offer, I remarked to my friend, standing beside me—who said, "Very reasonable price"—"Yes, but I would rather pay 50*l.* not to have his sculpture in my building, than pay 30*l.* and have it." My advice to you is: Avoid this kind of sculpture, as well as all pretence at sham art. If you cannot get the real article, do without it.

Mr. F. W. Pomeroy next read a paper on "Plaster Work." After a few preliminary remarks, he said: The material known as plaster-of-Paris is the basis of nearly all work I shall consider this evening, and is used by sculptors and others for taking casts, &c. It was well known to the ancients, who obtained from Syria, and probably other countries, a stone called by Theophrastus "gypsos," which resembled alabaster, and was converted into plaster by burning in a suitable furnace, grinding and sifting. If one part of plaster is mixed with about 2½ parts water, after a time it sets into a hard and enduring mass. It was employed in the same way and for similar purposes as at the present day. One of the most important deposits is that of Montmartre, Paris, but it is also found abundantly in Derbyshire, in this country, and many other parts of Europe and America. The purer semi-transparent specimens of gypsum or alabaster is used for ornamental work, such as fine masonry and statuary, and is a very durable and beautiful material for interior work. By adding a little lime to plaster-of-Paris, it causes it to set slower, but increases its hardness. Substances other than lime are also employed for the purpose of rendering the mass hard, thus Parian cement consists of fine plaster mixed with alum and borax and reburning.

A cement used by marble-masons is made of the same plaster mixed with a small quantity of alum and soda. For building work, a first coat is generally laid on of lime thoroughly slacked (so as to be free from all tendency to contract moisture) and mixed with sand and cow-hair.

The face of this coat (which should be of considerable thickness) is trowelled or indented with cross lines to form a key for the finished coverings. The second coat is applied when the first is thoroughly dry. (This is a necessary precaution, or the damp will work through and destroy or discolour any decoration that may be applied.) It is then rubbed with a flat board or float, so as to fill the indentations and cover the surface equally. The ornamental or finer plaster-of-Paris is then applied before the second coat is quite dry.

Many architects desire that their ornament should be modelled *in situ*, and I am fully aware of the importance of this, but have always found that it is quite impossible under the present conditions of building to carry out entirely a design of an elaborate nature, such as figure-work or intricate foliage; a simple design is possible only; and the plan generally adopted is to model in clay or wax a piece sufficiently large to form an idea of the scale and projection of the modelling, and offer it up in something like the position it will

eventually occupy. As a ceiling is generally lighted from windows that come underneath, a good way of testing the effect is to lay the model flat on the floor, and hold a good-sized looking-glass as high as necessary above it; by this means one can get a good general idea of the effect of the whole.

But reflected lights and other reasons demand that the work should always be considered in a liquid state—*i.e.*, to be worked on and completed after it is fixed. This may be said to apply to all architectural decoration.

Where the windows run up close to the ceiling I have found flat or low relief most agreeable, and very high relief is never desirable; it harbours dirt and dust, and throws shadows which become very troublesome to the people who have to live in the rooms.

The charm of much of the old ceiling work, I venture to think, is enhanced by the many coats of paint or whitewash they have received, which has stopped up the small blacks in the work, and accidentally given breadth to the whole, and much modern work would be improved by the same treatment.

I have tried in ceiling work that I have been engaged on lately to avoid sharp undercutting, and, where undercutting is necessary, to give accent to the design, it should be done with a rounded instead of a sharp edge, and a much softer shadow is thus obtained. But as each fresh work is a new problem, so, the modeller, to have the true decorative spirit, must constantly bear in mind the general scheme of the mouldings that surround his work and govern the scale; and perhaps the most noticeable feature in modern surface decoration is overcrowding, and one of the greatest difficulties of the designer is to know how much to leave out rather than what to put in.

Indeed, the designer who understands this quality has got well through his troubles, and the value of an occasional plain space cannot be over-estimated.

Of course, the well-trained figure sculptor understands the value of tone, light and shade, and envelopment, but, unfortunately, the common or every-day carver has little or no time allowed to consider such abstruse problems; consequently his only idea is to make the particular piece of work that he is engaged on "sing out," without any regard to the ensemble.

For repeating ornamental plaster models, gelatine, wax, and piece moulding in plaster are the methods usually employed. Gelatine is the simplest and best when only a few casts are required, as it can be done without any complications in the case of undercutting. Wax moulds are generally used for the so-called fibrous or canvas casts of commerce, as the canvas in the plaster holds the moisture too long and destroys the face of the gelatine.

Piece moulding is a more complicated way of obtaining reproductions, and is used by moulders who may desire to preserve their moulds for future occasion. The object to be cast is covered by a number of pieces of plaster, the edges of which are trimmed with a knife, and so arranged that they will each draw freely, then moistened with a little sweet oil and soap mixed, to prevent sticking together; when this process is complete it is necessary to hold them together by means of a case, also made of plaster. The liquid mass is then poured in slowly, and the mould turned, so that it may be covered equally. When set, the outer case is removed, and then each piece carefully drawn away from the reproduction and replaced in the case. The thin seams which one sees on the plaster casts are caused by these joints in the piece mould. For work executed *in situ*, a mixture of Parian cement, well burnt slacked lime, putty and silver sand (the proportions varying for different kinds of work, but generally about two parts Parian cement to one of sand and one lime; but this is more properly stucco-duro), and a ground of Portland cement and common hair mortar is used, the Portland cement stopping the suction and allowing the applied stucco to set more slowly.

Stucco-duro, as practised by the Italians, is a very ancient method, mentioned by Vitruvius. It fell into disuse, but was revived in the sixteenth century.

Raphael and Giovanni da Undine were then so interested by the discoveries during the exhumation of the Baths of Titus, under Leo X., that they at once made experiments in this material, and the Loggia of the Vatican was one of the first results. It was composed of plaster-of-Paris, silver sand, and marble dust, and was capable of taking a high polish. In Kensington Museum there is a beautiful model of the central hall of the Villa Madama in Rome, which was decorated by Giulio Romano and Giovanni da Undine. The model also exemplifies the possibilities of this composition, for its maker, Professor Mariani, of Perugia, has employed stucco-duro for the modelling of the ornament, which shows it can be used for the finest work; indeed, it is used by modellers for goldsmith's work as less liable to injury than wax. If used too quickly and heavily it will crack, but it must be modelled rapidly and surely, and only those of great dexterity need attempt it.

A stucco composed of plaster and glue-water is used by modern sculptors, and is preferred to clay for very large work. Mr. Watts modelled his great statue of Hugh Lupus, for Eaton Hall, in it; and the groups in front of the Trocadéro, in Paris, by Falguiere; also the quadriga, temporarily placed on the Arc de Triomphe, were modelled in this material.

You first make a sketch model in clay or wax to scale, taking great care to have your proportions exact; then the large framework is made of iron supports and wood covering, and a rough coat is laid on; after this the work is modelled in the stucco. Finish can be obtained by using flat brushes; it has a very loose and pleasant surface if done properly.

Stucco work was much employed on the Palace of Nonsuch, built by Henry VIII. It was executed by artists brought from Italy, but every trace of this palace has disappeared; but the men left their influence, and stucco was employed to decorate houses until the end of the reign of Charles II., when it began to decline.

Graffito, or sgraffito, is another way of decorating by means of prepared plaster grounds, cutting away or scratching through the upper surface, and revealing in parts a background of a different colour.

The first coat is made of sharp sand and Portland cement; the second coat is usually coloured with Indian red, yellow ochre, or manganese black. About one part of prepared distemper colour to one and a-half of Portland cement is the proportions for this. Then a final coating of selenetic cement and silver sand carefully mixed together is laid on very thinly, not thicker than one-sixteenth of an inch, before the second coat is quite dry. Then the cartoon, having been prepared, is placed on the surface, and the outline firmly pricked and pounced, the cartoon removed, and the design cut into the surface of the second coat, which is done with a steel scraper. Parian cement may be used instead of selenetic if the outer coating is desired white.

Care must be taken in cutting, which should be with slanting edges, which gives roundness and softness to the finished work. A good draughtsman will have little trouble in learning this kind of work, and it should commend itself to architects for its durability.

Gesso is yet another way of using plaster, but this more properly belongs to the painter's art, and is most successful when confined to very low relief work, as for the decoration of frames, caskets, panels of cabinets, &c. There are many kinds of gesso, and fine examples may be seen in Kensington Museum. For bold work plaster of Paris and thin glue or size water, a little tow pulled thin and steeped in the stuff, is used for building up your projections; a few flat-headed copper nails are useful if they can be driven into the background to prevent the work lifting. This should really be applied to a wood or fibrous plaster background, and it is always necessary to stop suction by painting the ground over with a coating of thin shellac.

For fine work, laid on with a brush, glass makes a good foundation; you can lay it over the design and copy through; the liquid gesso, which must be used hot, is composed of whiting previously soaked in water and mixed with linseed oil, and a little resin added. The proportions vary, but it can be made very easily, and a few experiments will ensure success. A pot of hot water should be kept handy to clean your brushes as the stuff cools. I have used, on the recommendation of Mr. Walter Crane, a very good stuff called "Denoline" sold by most colourmen. This is a fine powder done up in 1s. boxes, and is used by mixing with cold water only. You may make it stiff or liquid as you require it. It sets hard but slowly, and sticks fast—great virtues in gesso. Whiting and parchment size is the gesso used by frame makers; ordinary housepainter's putty worked up with whiting, oil and water, is also used for scrolls, &c. Carton pierce is a material much used in France, but I have had no experience with it.

I was told of a method employed by an American artist, which [illegible] ous. He had his gesso prepared and put up in leaden tubes similar to those used for oil colours. Then preparing his back-ground by tracing the design slightly on it he squeezes the gesso on, and flattens such parts as require it, with an ivory or steel tool. For mere line design this way is admirable, and one may work with great rapidity, much quicker than would be possible with a brush.

There are many processes for hardening plaster-of-Paris; one way is to dissolve a quarter of an ounce of soft soap in a pint of water, and an equal quantity of white wax is afterwards incorporated.

The cast is dipped in this liquid, or, if a surface of any dimensions, the mixture is laid on with a soft brush. After drying about a week, it may be polished with soft rag and French chalk.

Linseed-oil and wax is used by some, but this turns very dark in time, and in places where hidden from the light it will become almost black.

Another way is to give the plaster a thin coating of white shellac, then paint over this a good coating of boiled soft soap, and polishing when dry with a rag. This is useful for stopping the porous surface of the plaster, but it must be perfectly dry before the coating is applied. I am told a Mrs. Laxton Clark invented a means of hardening plaster, but I think all modellers would prefer putting their work in a more durable material.

The tools and materials required for gesso, stucco, and similar work can be easily obtained at various oil and colour warehouses in London. I have found that a child's rubber ball cut in half an excellent vessel for mixing small quantities in; it can be cleaned easily by merely turning inside out, and does not break; a few basins, a glue-pot, some iron plaster-spoons, and some small steel spatulas will also be required.

I have endeavoured in as brief a manner as possible to explain some of the most important uses of plaster for decorative purposes; but to become thoroughly acquainted with any particular work, the student should spend a short time in the workshops, for the secret lies not in the tools or materials, but in the hand and brain of the worker.

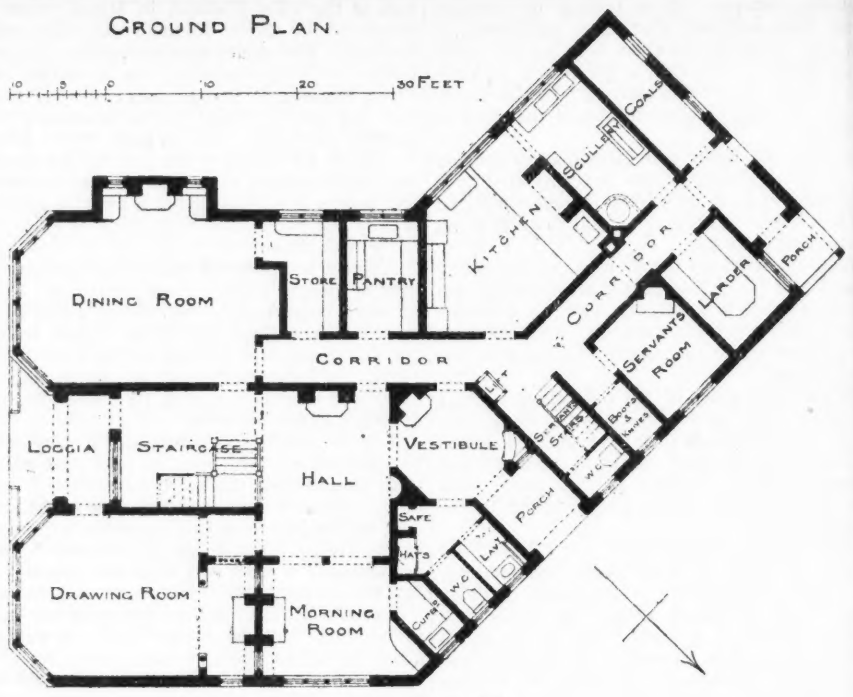
The Chairman, in inviting discussion, said that he saw amongst them Mr. Statham, who was a great and sincere friend of the Association. Though Mr. Statham had contributed a long and deeply interesting paper at the last meeting he hoped it would not prevent him taking part in the discussion that evening.

Mr. H. H. Statham said he could not but feel pleased at having the opportunity of proposing a vote of thanks for the two very interesting papers they had listened to, and also of expressing his sympathy with the general views contained in that of Mr. Lee. They must all feel that when sculpture had to be added to architecture, it must be sculpture with a meaning; it must have a reason for its place, and be as good as could be got. He would never forget the shock he received when he heard a very eminent architect, now dead, in receiving a large number of architects on a great building, tell them, amongst other things, that, as the Government had accused them of being extravagant, he was happy to say that the sculpture on the building, which came to about £6,000, was about £53 less than the estimate. That was the only time he had ever heard an eminent architect congratulate himself on having got cheap sculpture, and he did not consider it very wise. They might depend upon it that if they had cheap sculpture, one or other was cheated, either the sculptor or the public. In regard to shop sculpture there was a good story, which he had told in print many years ago. The Dean of one of our cathedrals was going to restore the building, and looking at the new sculpture at another cathedral, he made inquiries as to the cost. Asking what a figure of David had cost, he was informed that the monarch's effigy was rather expensive, there were harps and other details. "Then," said he, "what about that angel?" "Oh," replied the man, "we think nothing of the angels; we turn them out by the dozen!" There was far too much sculpture on buildings at the present day which had the appearance of being "turned out by the dozen." What was wanted was that the sculpture should justify its position, by having some reference to the purposes of the building, and telling its story. As Mr. Lee had shown, the lines should harmonise with the lines and shadows of the projections of the building. He was particularly interested when he found that part of the theme of Mr. Lee's address was his [illegible] St. George's Hall. He had felt

the greatest vexation at seeing it left for many years entirely cold and unadorned, having been designed to be decorated with sculpture, upon which it really depended for half its effect. It was, therefore, with the greatest pleasure he heard a few years ago that Mr. Lee had, after much opposition, received a commission to carry out some part of the work, and he only hoped the whole of it would be carried out before long. He had also been very interested with Mr. Lee's demonstration of the difference between building up a bas-relief and working down a bas-relief, and thought the two panels exhibited formed a most instructive lesson in that respect. There was one question he should like to ask. His recollection was that in the panels between the pilasters Elmes left projections in relief in the stone, intended eventually to be carved. He had a strong recollection that, in early days, he had seen these standing out in relief, that they were cut away, and the sculpture executed in marble, which was no doubt more satisfactory to the sculptor, but did not increase the sculptural aspect of the building. That was the only criticism he had felt inclined to make. He believed the sculpture was intended by Elmes to be in the stone of which the building was constructed. Mr. Lee had spoken very strongly of the importance of light in which the sculpture should be seen, and had referred to the Parthenon. Now it had always been a great puzzle to him why the Greeks put a frieze in low relief right at the top of the wall, under the shade of the roof, where it could not be seen very far off. It was necessary to look up at it at an acute angle; there was no top light at all; and if Mr. Lee could give a reason why that was done, it would be a valuable piece of instruction. He had much pleasure in proposing a vote of thanks to Mr. Lee and Mr. Pomeroy for their very valuable papers.

Mr. G. Fellowes Prynne, in seconding the vote of thanks, remarked that the temptation of an architect was to see his work complete, and to consider that if he did not see the sculpture put in, it would never be done. He did not attempt to excuse that, but they had to face the fact that the expense of sculpture was the one thing which prevented its being used more often. Only the other day in Yorkshire he heard a peer say at a meeting that he had to go to Belgium for some sculpture, a crucifix or other figure for use in a reredos, which he had got for 10*l.*, and better executed than anything he had seen done in England. They had to face the fact that many of the moneyed classes here did not understand the value of sculpture in architecture, and when they did, the question of how cheaply it could be got arose. There was a rising school in this country who tried to thoroughly enter into the spirit of the architects. In sculpture, as in painting, and especially in ecclesiastical work, it was essential that the sculptor and painter should thoroughly enter into the feeling of the architect, and that he, in his turn, should have absolute sympathy with them. Mr. Lee had said that there could not be any really good work unless it told its own tale, and in Gothic as well as Greek work that was essentially the case. Clearly, Gothic work had its own direct meaning, the whole idea being symbolism from beginning to end. The beautiful idea in all sculpture was not to fill a given space with so much ornament, but to show the history that it told and the tale that it spoke. As Mr. Pomeroy had said, it seemed a mistake, and a mistake too often repeated, to put high reliefs in ceilings, which cast heavy shadows, and, especially with a centre light, gave an unpleasant and heavy effect.

Mr. W. D. Caröe said he had been struck by Mr. Lee's reference to light. One so often found in modern architectural figures placed upon buildings a number of small folds introduced on the surface of the draperies which took away from the bossy effect that sculpture ought to possess as a surface of light upon a shaded background. He was also very interested to hear Mr. Pomeroy refer to gesso, for which he (the speaker) had a great liking, especially in connexion with work which had to be painted. Mr. Pomeroy had referred to the fact that gesso was always best used in low relief, and he would like to know what he meant by that? In working with gesso which had to be painted, they got the direct work of the sculptor, without any intermediate processes. In reredos work in wood or stone it had to be moulded, cast, and carved, and the carved surface painted. For such a process gesso was sufficiently durable, and they were much more likely to get the sculptor's direct interpretation. He was at present using gesso for that purpose, attempting a relief of about



House at Enfield.

1½ in., and he would like to know if Mr. Pomeroy thought it was possible or advisable. He could not quite agree with sculptors who wished to turn their plaster into other material. Plaster was one of the most charming materials possible, and he could not see why it should not be used more than it was, by way of figure decoration in the house, where it was not likely to meet with much hard treatment. In cases where it was necessary to employ cheap sculpture it was possible to get internal effects with plaster figures, which were quite as useful as if they had been executed in marble, and any process such as Mr. Pomeroy had described, by which the surface of the plaster could be so treated that it might be washed and properly preserved, was most valuable.

Mr. Pomeroy said it should be rather called stucco than plaster. Gesso was a material which was generally used in the sixteenth century for decorating leather-work, and was always most successful for flat work. Stucco duro would be the best thing to work in. The Italians cast stucco duro, and decorations and ornaments were added afterwards, the suction being stopped by applying a coat of shellac or something of the kind. The matrix should be of wax, as it would be rather slow in setting, and it was little more expensive, unless there was much under-cutting in the work.

The Chairman echoed the sentiments expressed by Mr. Lee as to the great advisability of architects and sculptors coming into close connexion with each other's work. He could not conceive that half the mistakes connected with Gothic carving would have occurred if architects had taken the trouble to ascertain the fact that the sculptor of the nineteenth century could not be expected to think as the sculptor of the eleventh or twelfth centuries did. The result had been that architects had designed beautiful churches, in accordance with all the principles of the Mediæval revival, but had been compelled to get sculptors' apprentices to produce barbaric, ill-judged, and inartistic figures. If architects would get in the way of understanding how sculptors did their work and what they meant by it, and if sculptors would take the pains to understand how good architects did theirs, a great deal of the mischief from which they had been suffering would never have existed. In a building, which contained the finest work of Alfred Stevens, a magnificent sculptural opportunity had been practically let out to foreign "ghosts." This question was practically an architects' question, and they had the remedy in their own hands. If they had created the disease they still possessed the remedy. It was not necessary for the architect to wait until he got a building which would stand sculpture, as there were few of them who had not the opportunity of dealing with sculptured carving. Now architectural carving he would confine to billets and dentils, and to the things that the Quantity Surveyor could count, and the lithographer could sketch in the margin of the estimate. They should begin to regard the smallest bit of carving on a building as being sculpture, and see how truly any ornament gave an opportunity of expressing some thought and idea in a scheme of decoration, consistently carried out, not only in bosses and strings, but in capitals and panels. They would not have to wait long before they had an opportunity of spending quite a sufficient amount to enable them to get good work. At the same time they should study, and sketch, and think out such carving for themselves. He was not altogether inclined to be pessimistic as to sculpture, and he did not think it need be prohibitively expensive. Since last he had attended these meetings a very great friend of all architectural students had passed away in the person of Dr. Reginald Poole, of the British Museum. Dr. Poole on one occasion said that the process of the purest and best Greek design appeared to be the process of eliminating every element not necessary to the perfecting of the work. This had been also expressed by Mr. Stirling Lee as the process of the sculptor, who eliminated all material down to the lowest point at which the artistic intellect was satisfied.

Votes of thanks were then accorded to Messrs. Lee, Pomeroy, and Young, and also to Mr. Pomeroy's assistant.

Mr. Lee, in replying, said that the stone used at St. George's Hall, which had been referred to, was not marble but Istrian stone. After careful thought, they found that where the Darley Dale stone was shelved, it was going in places. They then found the Istrian stone, which would stand for centuries, and which, at the same time, was nearly the same colour as the Darley Dale, and this enabled him to do his work more seriously. As to the Parthenon, the only thing one could feel was that the Greeks desired to make a record of their presentation of the Panathenaic Peplos, and they had to put it somewhere. The work did not tell as a relief, but it was a wonderful study of reflected light from the sculptor's point of view. The frieze was coloured in the background, so that, seen from underneath, the whole thing told as a colour-scheme of decoration. Whether it was put as a record, or to be used as a feature, he would not like to say, but it had solved the law of sight. He had brought the photo of Wells Cathedral to show the excellent scheme of decoration.

Mr. Pomeroy also returned thanks. What he had told them were matters of practical experience, and if any of his hearers wished for further information, he would gladly afford it at any time.

The proceedings then terminated.

ARCHITECTURAL ASSOCIATION (DISCUSSION SECTION).—The eighth meeting of the session of the Discussion Section of the Architectural Association was held on the 6th inst. at 56, Great Marlborough-street, the paper read being one upon "Entrances and Doors," by Mr. Matt. Garbutt, A.R.I.B.A. The discussion was opened by Mr. Stockdale, and sustained by Messrs. Greenop, Brodie, and Tyars. The Chairman (Mr. W. Henry White) proposed a vote of thanks to the author, which was passed. Upon the motion of Mr. Satchell, a vote of thanks was passed to the A.A. Camera Club for the invitation extended

to members of the Discussion Section on the occasion of Mr. Arnold B. Mitchell's lecture on "Vaulting," on the 4th inst. The meeting then terminated.

Illustrations.

SCHEME FOR THE PARIS EXHIBITION OF 1900.

WE publish to-day the bird's-eye view of the design by M. Girault for laying out the Paris Exhibition of 1900. That of M. Hénard, which we published on February 16, represented the type of design in which the Palais de l'Industrie was to be removed and rebuilt. This design by M. Girault represents a scheme for combining the Palais de l'Industrie, as it now exists, with the new buildings. This has been cleverly managed by the introduction of a circular building with a cupola, which forms the connecting link between the line of the Seine quay and the oblique line of the Palais de l'Industrie. It is probable, however, that the latter building will not be left *in statu quo*; and, indeed, at present it is in want of much more repair than it would seem quite worth while to give to a building which has nothing very much to recommend it except good lighting.

The third of the three 6,000 francs premiated designs we also had photographed, but it is so slightly drawn, and is so very decidedly a "bird's-eye view" (being, in fact, almost a plan) that it is hardly of sufficient interest to justify publication.

The photographs of the premiated designs were made for this Journal only by our own photographer, and by the special permission of M. Bouvard, the superintending architect to the Exhibition.

HAMBLETON CHURCH, RUTLAND.

THE restoration of the chancel of the above church includes a new chancel arch, screen, oak roof, side windows, sedilia and organ chamber, with all finishings as shown.

The East window is old, also the walls, which are strengthened by massive buttresses at the side, and at each angle of the East wall.

The reredos consists of a burnished gilt triptych enclosing the subject of the Crucifixion in colour. The retable is of polished black Derbyshire marble, also the steps throughout, the floor being of Hopton Wood stone, and the lower part of the walls covered with *opus*.

The altar candlesticks, the candelabra altar rail, and sanctuary lamps are of burnished brass.

The East wall is hung with hangings of yellow ornament on a ground of green velvet, and with the altar frontals were embroidered by the Sisters of Bethany, who also made the altar linen.

The choir stalls are in oak and the chancel screen in wrought iron.

The lectern is in oak (three-sided), on one side having the Sacred monogram with "Cœlum et terra transitibunt," &c., on the other two sides the Alpha and Omega with "In principio erat verbum," &c., and a St. Andrew's Cross with "Sic erit verbum meum quod egredictur," &c.

The fald-stool, also in oak, has a top supported by spindles and inverted scrolls, similar in treatment to the lectern, but with the altar, the cherubims and incense, representing the prayers of the Saints ascending up before God carved thereon in low relief.

At present the east window only has been filled with glass, but it is designed as a part of a complete scheme for the whole chancel. The idea to be represented is the Life of Victory, the Celestial, *i.e.*, the brightness of the Glory of Heaven above; with the Terrestrial, *i.e.*, the darker colouring of earth below.

The glass and finishings are by Mr. J. Egan, of Wells-street, Messrs. Cornish and Gaymer being the contractors, the entire cost of the work being defrayed by Mr. W. Gore Marshall, of Hambleton House.

JOHN P. LEE.

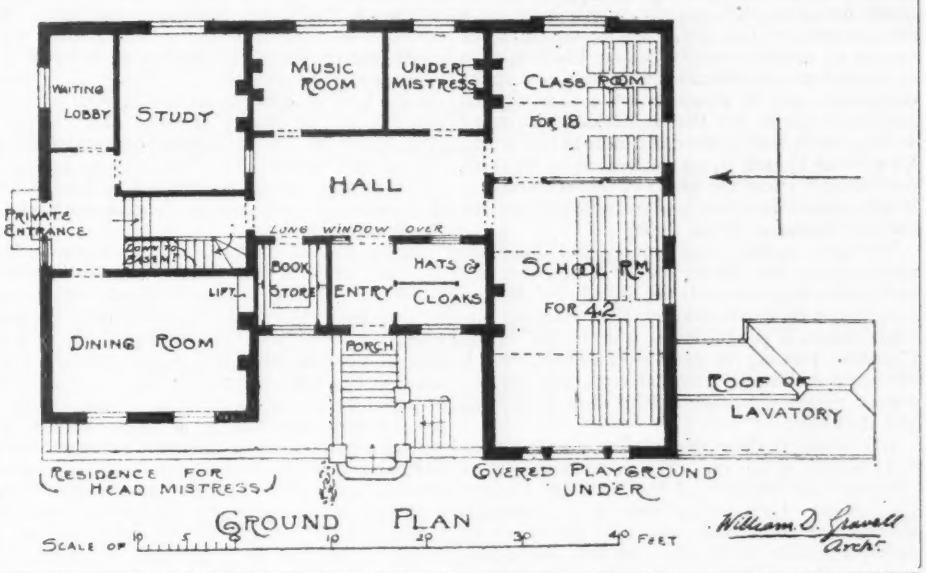
BILLIARD-ROOM, "BLAWITH," GRANGE-OVER-SANDS.

THE exterior of this house has already been illustrated in this journal. All the main rooms on the ground floor are panelled from floor to ceiling. In the case of the billiard-room, the doorway, ingle-nook arch, and elliptical chimney-piece are of red stone, the ceiling moulded and modelled plaster, the woodwork oak.

The architects are Messrs. Willink & Thicknesse, of Liverpool; the contractors for the woodwork are Messrs. Morrison & Sons, of Wavertree; the plasterwork is executed by Messrs. Goodall & Co., and the carving by Mr. Griffiths, both of Liverpool.

The drawing was exhibited at the Royal Academy of last year.

FRAMLINGHAM GRAMMAR SCHOOL.



PRINCIPAL ENTRANCE, COUNTY COUNCIL OFFICES, WAKEFIELD.

THIS is the main entrance to the building erected from the designs of Messrs. Gibson & Russell, for the Wakefield County Council, a general view of which was published in the *Builder* for November 10, 1894, together with a description of the building, to which we refer the reader.

The drawing of the entrance, as well as the general view referred to, was exhibited at the last Royal Academy exhibition.

HOUSE AT ENFIELD.

THIS house is built on the slope of a hill, and the garden front overlooks the valley and distant country.

The ground story is built with red bricks, the upper story is in parts hung with red tiles, and the remainder half-timbered work, the roof being covered with brindle-coloured Broseley tiles.

The half-timbering is all constructional, the overhanging cill of upper story being moulded out of solid timber 12 in. by 12 in.

The plan and interior of the house was carefully thought out by a client who worked with the architect to produce the result he desired.

The whole of the ground floor is laid with wood blocks in various woods. The walls of the corridor and servants' offices are lined with salt-glazed bricks, the sinks, washing troughs, lavatories, &c., of white glazed pottery.

The joiners' work to the principal rooms is of oak, and the servants' offices of basswood, all polished.

The mantelpieees are of coloured glazed faïence. On bedroom floor the joiners' work is of polished basswood.

The baths are of white glazed pottery with marble wall linings. Mantelpieces glazed faïence.

The end of the bedroom floor is planned so that it can be isolated from the remaining bedrooms if necessary, and used as a sick-room, with nurse's room, bath, lavatory, and water-closet, and approached by a back staircase.

The builders were Messrs. Aldin, of South Kensington, and the architect is Mr. T. W. Cutler.

The drawing was exhibited at the last Royal Academy Exhibition.

DESIGN FOR FRAMLINGHAM GRAMMAR SCHOOL.

THIS was one of the designs submitted in competition some time ago for Mills' Grammar School at Framlingham, Suffolk. The accommodation required was a day-school for sixty girls and a residence for the head-mistress. The design shows a brick and stone treatment with tiled roofs.

The design is by Mr. W. D. Gravell, and the drawing was exhibited at the last Royal Academy Exhibition.

DRAWINGS FOR THE ROYAL ACADEMY.

WE may remind our readers that drawings sent to the Royal Academy, and which the authors may wish to have published in our pages and in the "*Builder* Album of Academy Architecture," will be delivered at Burlington House from this office (as has been done for several years past), if sent here in time to be photographed before sending in to the Academy. It is essential, however, that such drawings should be furnished with a label giving the title and author's name, attached to the frame by a cord, a similar label pasted on the back, and a letter to the secretary R.A., repeating the same information; in accordance with the Royal Academy regulations. *We cannot undertake to supply such labels if not affixed.*

The last day for receiving at the Academy is Monday, April 1st, and we cannot receive drawings here later than the previous Saturday morning. We should of course be glad to have them much earlier than that where possible.

MAGAZINES AND REVIEWS.*

IN the *Art Journal* the article which will attract most general interest is that on Madame Millet, the wife, and now widow, of the great peasant-painter, with a portrait sketch of her, and a sketch of their home, the former from a drawing by Millet himself. Mr. Davey concludes his article on St. Sophia, and Mr. Shaw-Sparrow continues his on paintings and sculptures as histrionic studies, in which, however, we seem still to be waiting for the real business implied in the title.

The *Studio* occupies a considerable portion of its issue over "The Art of Utamaro," a Japanese designer of colour prints, the illustrations of whose incapably-drawn figures are numerous, and overflow into the margins of Mr. Wedmore's article on the more interesting subject of Venetian Art. The time will come when people will wonder what possessed this generation to run after such childish figure-drawing as these Japanese examples. The whole number is as usual largely and well illustrated, though we find only a partial interest in photographic studies of foreground, and should prefer studies made by the hand of the draughtsman.

The *Artist* contains a good many interesting designs for textiles, book-plates, and other ornamental work, a reproduction of one of M. Helleu's etchings, and an illustrated article by Mr. Henry Holiday on "Dress in the Millennium," carrying out Ruskin's idea that each profession or trade should have its own characteristic dress. Mr.

* The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

Holiday has however purposely made all his figures in the dress of the present day awkward or ugly in attitude and manner, and all the others handsome and graceful, which is hardly a fair statement of the case. We do not think the temper of modern society is ever likely now to approve of or sympathise with this kind of costume distinction, and it shows rather a short-sighted perception not to see that in the most cultivated society the tendency is more and more to take a man for what he himself is, personally, not for what his occupation is; and the habits of modern dress, in which distinctive differences are avoided, are the natural expression of this feeling.

We have received the January and February numbers (not the March one) of a new monthly antiquarian magazine entitled *Scots Lore*,* dealing especially with Scottish antiquities. Among the contributions is an interesting one, by Mr. P. M. Chalmers, running through both numbers, on "A Mediæval Architect," John Morow, who left inscribed records of himself and his work at Melrose and elsewhere.

Blackwood's contains an exceedingly well-written and judicious article on "The Scottish School of Painting" in relation to the Grafton Gallery Exhibition. Considering that it is probably written by a Scotchman, and with the object of calling attention to Scottish painters, the moderate and discriminating tone of the criticism is the more remarkable. The author's remarks as to the landscapes of Thomson, of Duddingston, exactly hit the truth as to the real merits of these works and the extent to which they have lost interest at the present day.

The *Fortnightly Review* contains an article by Mr. Claude Phillips on "Venetian Art in the New Gallery," in which he remarks, as we did, on the possibilities existing in England for a really typical exhibition of Venetian painting of the highest class, instead of what has actually been seen, a heterogeneous collection of works of, in many cases, very doubtful value. The critical remarks on many of the pictures, and discussion of their authenticity, are written with knowledge and judgment, and are of considerable interest.

The *Nineteenth Century* contains a kind of mock-Mediæval chronicle by Miss Emily Lawless, on "The Builder of the Round Towers" (in Ireland) suggesting how and why they were erected; it is mere romance, but well done. The same number includes an article by Sir J. C. Robinson on Rembrandt and Sir Joshua Reynolds.

In *Macmillan* an article on "The Transformation of the Black Country" gives some rather hopeful account of attempts to plant up some of the old spoil-banks and pit-banks in this desolate region of England, which we trust may meet with the success they deserve.

In *Harper* the article on the Industrial Region of Northern Alabama, by Mr. Julian Ralph, gives an account and illustrations (including some architectural ones) of a busy part of the world little known to most English people. The short article "An American Academy at Rome," by M. Royal Cortissoz, is a consideration of the necessity or wisdom of having another Villa Medici, for American students, as to which he seems rather doubtful. The article is accompanied by two illustrations of the Villa Medici, where so many eminent men among French painters and architects of this century have studied.

The Century contains an article on Peter de Hooch (or Hooghe) by Mr. Timothy Cole, and one by M. E. Hovelaque on "Jean Carriès, Sculptor and Potter," whose works in bronze, wax, and pottery obtained a considerable and almost sudden reputation in the Salon of 1892. The illustrations of various heads modelled by him fully bear out the place claimed for him as a remarkable and original artist, especially the helmeted "Bust of a Soldier," which reminds one of Leonardo da Vinci. This talented artist, unhappily, died prematurely last year, and since the article on his works was written.

In *Scribner* the monthly article on American wood engravers deals with the work of Mr. F. S. King, whose delicate engraving "Flowers of the Air" forms the frontispiece to the number. A good remark of Mr. King's is quoted, to the effect that as we do not "look a picture in the face," but see it at a distance, with every detail blended and harmonised, so the effort of the engraver should be to give "the effect of distance at close range."

Le Monde Moderne (Paris) is certainly one of the most comprehensive magazines of the day, in regard to range of subject, including social, artistic, literary, musical, dramatic, and military criticisms, &c. The illustrations to the short article on "L'École Nationale des Arts Décoratifs" do not give a very high idea of the state of decorative design in France, in spite of her extensive machinery for producing it. They show a kind of effort at prettiness, with no firmness of line or dignity of form, and the plant types used are not sufficiently conventionalised. We do not know whether these designs represent a type of work which is admired in France, but they certainly would not be thought much of by English designers.

In the *Pall Mall Magazine* is an article by Mr. W. H. Mallock on "The Census and the Condition of the People," largely illustrated by diagrams, showing in a graphic form the proportion of employed to unemployed, the proportion of persons who live in one-roomed, two-roomed, and three-roomed houses, &c., &c. The object of the writer, as stated at the conclusion, is to show that overcrowding is an accident of our industrial system, not a necessary accompaniment to it, and that the tendency of things at present is towards a gradual but sure improvement in the condition of the people. Mr. Walter Besant's "Westminster" article in the same number is mainly concerned with political reminiscences, and is accompanied by several views of the Houses of Lords and Commons, internally and externally, before the fire which led to their rebuilding.

In the *Gentleman's Magazine* "Drops from the Clouds" is an article by Mr. W. W. Wagstaff, of some interest on observations of rainfall in recent years, with some remarks on the management of rain-gauges. An unsigned article on "Money-Making at the Tower," is a sketch of the history of the early days at the Mint.

The *Idler* contains a well-illustrated article of some interest on the working of a large passenger steamer, under the title "An Ocean Flyer."

* W. Hodge & Co., Glasgow; Elliot Stock, London.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

ALL HALLOWS CHURCH, GOSPEL OAK.

THE third Spring Visit of the Architectural Association was paid on Saturday last to the Church of All Hallows, Gospel Oak. The party were met by Mr. James Brooks, the architect, who, in his preliminary remarks, said that he, in common with all architects, must feel proud when the Architectural Association deemed a building of his worthy of a visit. We have already illustrated this church, and given a description of it,* but the following notes are given in addition.

The south aisle is fitted up as a chapel, with a separate entrance by means of a narrow aisle. At the east end are two octagonal turrets containing staircases for access to roof and organ-chamber, which is situated over the north chancel aisle. The most noticeable feature, Mr. Brooks explained, was the vaulting, the aisles being carried up the whole height of the church; the ribs of the vaulting spring at a height of 28 ft. from the nave floor, from cylindrical shafts 2 ft. 8 in. in diameter. As eight ribs spring from every pier, each of these ribs is exactly one foot in width.

The visit proved most interesting, as not only did Mr. Brooks read a short account of the church before conducting the members over, but also he had the kindness to have the whole of the working drawings of the church, including the interesting vaulting details, placed up for the inspection of the members, and was kind enough to explain these in detail. The party were afterwards entertained at tea by the Rev. W. Matheson, thus bringing to an end an interesting and instructive visit.

* The *Builder* Dec. 29, 1894.

THE SANITARY INSPECTORS' ASSOCIATION.

THE usual monthly meeting of this Association was held on the 2nd inst. at Carpenters' Hall, London Wall, when Mr. Thomas (Chairman of Council) presided, and Mr. Wilkinson, of the Derby Local Board, read a paper on "The Position of a Sanitary Inspector." Before the paper was read, Mr. Bath, who had a motion on the paper proposing that a memorial be presented to the Local Government Board, after being submitted for signature to all the Local Authorities and the sanitary inspectors in the kingdom, was induced to postpone his motion until after the result was known of a deputation which the President of the Local Government Board had promised to receive on the 15th inst. on the same subject, viz., the assimilation of the tenure of office of sanitary inspectors and inspectors of nuisances with that accorded in the Act of 1891 to medical officers of health.

Mr. Wilkinson in his paper pointed out that sanitary inspectors had very little trouble with honest builders or house-owners who were open to persuasion to such an extent that 90 per cent. of the nuisances found to exist were abated simply on the initiative of the sanitary inspector, without legal process. It was the minority, consisting of unprincipled builders and dishonest house-owners, who gave all the trouble, and in dealing with such men the law at present gave the inspector a position really little better than that of an errand boy, for he could only report to the Local Authority and must wait, before acting, for instructions from a body over which persons to be proceeded against had too often a paramount influence. In the difficult struggle against this dishonest but powerful minority, the inspector was without protection in his official position. Inspectors—thousands of them—lacked security of tenure in their offices, and were subject to dismissal at the end of any year, without remedy or appeal. They had no recognition from the Central Authority, and no provision was made for loss of life or health in the discharge of duties which brought them into daily contact with disease and death. The sanitary inspector who limited himself to inspecting and reporting would be a very inefficient officer, and the working classes, the very existance of whose families depended on the power of the workers to maintain their health and strength, would be the greatest sufferers by such a limitation. The inspector who discovered a nuisance and saw how it was caused, knew all that needed to be known about it, and if he knew his business he was the fittest person to see the remedial measures properly carried out. Inspectors had frequently to condemn work recently done under the supervision of other public departments. Proper inspection demanded the thorough testing of all appliance to find defects, and a similar testing of all new work before covering up. A register should be kept by the Sanitary Department of all drains and sanitary appliances, and power should be given to prevent alterations and additions without the consent and supervision of the department, which should deal with sanitary construction and inspection alone, in order to prevent jumble and overlapping. The question of the relative positions of the medical officer of health and the sanitary inspector in sanitary work was discussed in the paper. Before the passing of the recent Act, there were, outside London, 1,035 urban and 575 rural sanitary bodies, each with one or more inspectors and one medical officer of health, but while the great majority of the former were required to devote their whole time to their work, only about a score of the medical officers were required to do so by the terms of their appointment. Was it desirable, even where possible, for a consulting medical officer to climb down from his high position to take in hand detail work which could be better done, and at much less cost, by an officer having a more practical training? The inspector had no quarrel with the medical officer of health, and the lecturer had no hesitation in saying that if the superior officer would honestly give the inspectors credit for their own work, and be content to comment and advise thereon, there would never be the slightest friction, but the utmost loyalty, freedom, and goodwill between the two officials.

The usual vote of thanks was accorded on the motion of Mr. Scott Addison, seconded by Mr. Jones (Lambeth), and supported by Mr. Young (Battersea), Mr. Dee (Westminster), Mr. Baronet (Godstone), Mr. Kirk, and the chairman. In the course of the discussion a protest was raised on behalf of assistant sanitary inspectors against the assumption of all the credit and responsibility by many chief sanitary inspectors. Mr. Dee was of opinion that in one of the most troublesome questions of the time, that of "combined drainage," no difficulty need have arisen if the surveyors had done their duty. Had the administration of the law been left to the inspectors they would simply have carried out the details of the law, and there would have been no trouble. The vote of thanks having been put and carried, Mr. Wilkinson briefly replied to a number of the points raised, and the proceedings concluded with a conference on practical difficulties sometimes met with by sanitary inspectors.

INSTITUTE OF BUILDERS (INCORPORATED):

ANNUAL MEETING.

THE eleventh annual general meeting of this Institute was held at the offices, 31 and 32, Bedford-street, Strand, London, W.C., on the 5th inst., Mr. Robert Neill, Jun., J.P., presiding.

The Secretary, Mr. R. S. Henshaw, read the audited accounts, and the following report, which had been circulated among the members, was taken as read :—

In presenting their eleventh annual report the Council have to record with great regret the death of Mr. George Burt, D.L., J.P., an Honorary Member, who filled with distinction the office of President in the year 1888-9, and assisted materially in successfully establishing the Institute.

The London Streets and Buildings Bill promoted by the London County Council received the earnest attention of the Council, and it was considered desirable that the Institute should act in concert with the Central Association of Master Builders of London in opposing the Bill for the purpose of amending it. The Bill was referred to the Joint Parliamentary Committee of the two bodies, and the result can best be brought to the notice of members by the following report of the Joint Committee :—*

"Petitions against the Bill were forty in number, and included the Surveyors' Institution, the District Surveyors, the Ecclesiastical Commissioners, the Duke of Westminster, the Associated Land Owners and Leaseholders, the Corporation of London and the Commissioners of Sewers, and several of the Vestries, the School Board for London, the Firewood Merchants and the Advertising Contractors. Twenty-five different Counsel appeared before the Select Committee, and amongst the opposing parties the interests of the builders appeared to be more identified with the interests of the property owners, and your Committee were able in many cases to act in concert with them, and, by joint action, to establish a strong and successful opposition . . . Of the ninety-one amendments submitted by your Parliamentary Sub-Committee, sixteen were rejected, thirty-seven accepted as proposed, and the other thirty-eight were either accepted in a modified form or rendered unnecessary in consequence of the acceptance of other amendments . . . . The revision proposed by the Bill of the existing enactments relating to streets, roads, and building sites, were of the most drastic and confiscatory character; those relating to new undertakings being much more stringent than the existing law, but those relating to rebuilding would in the majority of cases have been simply prohibitory and were evidently intended to be so, and the principle which had hitherto existed, and allowed a person to act without consent of the authority so long as there was no infringement of the law, was intended to be superseded, and no one was to be allowed to do anything except with the consent of the London County Council first obtained. Your Sub-Committee asked to have the old principle continued in the new Bill, but were not successful; they, however, in conjunction with other petitioners, succeeded in getting a reasonable restriction as to the way in which the London County Council is to exercise its right of approval, which is now embodied in the Bill in the following form :—'Within two months after the receipt of any such application the Council shall either sanction the plans or give notice to the applicant of their disapproval thereof, stating fully all their reasons for such disapproval. Provided that if within the said period of two months the Council fail to give notice of their disapproval of any such plan or section they shall be deemed to have given their sanction thereto.' It will be seen from this clause that an obligation has been imposed on the London County Council which is entirely new, and is that they are to give their reasons for disapproval, which is an advantage to the applicant, and will enable him to revise his scheme and know how to do so to remove objections, and the consequential result in the event of the proposal not being adjudicated upon within two months is also new and in the interest of the applicant, and in reference to all cases of rebuilding, except in houses to be inhabited by persons of the working class, existing rights are conserved, whereas by the proposals in the Bill as first drawn they were entirely swept away.

One of the provisions which gave the London County Council the right to withhold their consent to the formation of any street with a gradient of less than one in thirty was amended on the motion of your Committee to one in twenty.

The provisions relating to the stacking of timber were not clear, and the ambiguities have been cleared up and removed, and existing rights preserved.

Important provisions in relation to adjoining properties, party-walls, &c., are enacted, some of them new, and the whole of these received the careful attention of your committee and the solicitor and counsel, and important revisions were made at their instance, not only upon matters of principle, but in relation to procedure and general administration.

Important modifications were made in the amount of penalties as proposed. The scale of fees to District Surveyors which was put forward was of a voluminous and complicated character, and has been amended, and the ambiguity with reference to the work of which a District Surveyor is entitled to have notice, has been removed, for it would have been difficult to say if anything at all could be done without notice.

A great deal of amendment was necessary, too, in the definitions and general forms of procedure, and many inconsistent and contradictory points had to be dealt with, and the action of your counsel met with support and consideration, and resulted in great improvement. Your Committee gave great consideration to the question of the powers which the London County Council sought to obtain in the matter of making by-laws, and in the result the almost unlimited authority which they endeavoured to obtain has been restricted, mainly on the action of your Committee, to the power to make by-laws subject to the provisions of the Act, and the by-laws before confirmation are to be sent to the Institute of Builders, thus giving to the Institute the opportunity of making any representation they may consider advisable to the Local Government Board before they are sanctioned, and it is important as being for the first time a statutory recognition of the Institute as a public body. An important point has been gained by ensuring that nearly every decision of the London County Council and the general jurisdiction of the District Surveyors is subject to appeal to the Tribunal of Appeal, though the efforts of your committee to secure the appointment by the Institute of a member of the Tribunal were not successful; the Constitution of the Tribunal has been considerably modified, and consists now of only three members, one appointed by the Royal Institute of British Architects, one by the Institute of Surveyors, and one by the Secretary of State, and your Committee secured an important provision in relation to the fixing the fees of the Appeal.

Important amendments were made in the schedule relating to the component parts of mortar and concrete, broken bricks being allowed in opposition to the wishes of the London County Council.

Perhaps the most important amendment carried by your Committee was that relating to the principle of Compensation wherever payable under the Act, which has been now made in conformity with the Statute Law.

Having regard to the very substantial amendments which had been made by the Select Committee of the House of Commons, your Sub-Committee, after carefully considering the Bill in its amended form, did not consider they would be justified in incurring the expense of a petition to the House of Lords in view of the comparatively small number of points to which they could usefully object.

Under these circumstances they prepared a memorandum which was communicated to the opposing landowners and public bodies explaining the points which in their view still required amendment, and offering to give evidence before the Committee of the House of Lords, an offer which was to some extent made use of by the opposing landowners.

With some further important amendments the Bill passed in the Upper House. . . ."

The negotiations between the Standing Committee for Practice of the Royal Institute of British Architects and a Committee of the Council on the proposed conditions of contract, have been continued during the year, but no agreement has yet been arrived at. The subject is most difficult and complicated, and, while the Council are quite alive to the necessity of stringent provisions being necessary in a building contract for the protection of the employer, yet they feel it is equally important to secure adequate protection of the builder against the arbitrary and inconsiderate use of these powers by those in whom they are vested. The Council are unable, at present, to report a satisfactory conclusion, and, unwilling as they are that the time and trouble which have been spent and the protracted negotiations come to an end without any settlement being arrived at, they are certain that it is better so, than that a form of contract should be arranged which would not be satisfactory to them nor one that they could recommend for general adoption, or that would be likely to be generally accepted.

In accordance with the Articles of Association the President, Mr. Robert Neill, Jun., one of the Vice-Presidents, Mr. John M. Burt, the Treasurer, Mr. George Plucknett, one of the Auditors, Mr. George Burt, and three members of the Council :—Messrs. Woodman Hill, Colin G. Patrick, and S. Wheeler, retire, but are eligible for re-election. Mr. H. I. Sanders also retires from the Auditorship and does not seek re-election.

It was resolved, "That the report and accounts be received and adopted." Mr. John Mowlem Burt was elected President for the ensuing year; Mr. Henry Holloway, a Vice-President; Mr. Geo. Plucknett, Treasurer; Mr. Geo. Burt, Mr. Henry Gough, Mr. B. E. Nightingale, and Mr. Samuel Wheeler were elected ordinary members of the Council; Mr. J. W. Duffield and Mr. Benjamin Hannen, jun., being elected auditors.

The meeting closed with a vote of thanks to Mr. Robert Neill, jun., for his services as President during the past year.

* We have been compelled to omit some portions of this report, for want of space.—ED.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—On the 2nd inst., the members of the Edinburgh Architectural Association paid a visit to the New Royal Observatory, which is nearing completion on Blackford Hill. The company were joined at the Observatory by Mr. W. W. Robertson, H.M. Board of Works, President of the Association and architect of the building, and Professor Ralph Copeland, the Astronomer Royal for Scotland. Mr. Robertson gave a short description of the main portions of the building. He said that in 1888 Lord Crawford of Balcarres offered to give his whole astronomical equipment at Dunecht, including the library, which contained over 15,000 volumes, as a gift to the nation. This gift necessitated the erection of a new Observatory. The site chosen had the advantage of being free from the smoke and haze of the city, and Professor Copeland had by means of minute experiments proved that the Observatory would be perfectly free from vibration. The buildings included the Observatory proper, the Astronomer Royal's house, houses for the assistants, and a gate lodge for the mechanic, as well as stabling accommodation. The T shape of the buildings had been chosen in order to give the Observatory a clear outlook, so that the instruments could be placed in such a position as to sweep the whole horizon round. Then the Transit House, which was one of the most important portions of the Observatory, was placed about 80 ft. from the main building. The first reason for that was in order that they might keep the meridian line clear from the other buildings. A covered way connected it with the main building, because it was absolutely necessary to good observing that the observer should reach his work dry-shod. The walls of the Transit House consisted of two thicknesses of metal with an inner and an outer covering of corrugated iron. The most complete arrangements were made to maintain an equal temperature, which was a very important consideration in such a place. Turning to the main building, Mr. Robertson said that the largest of the two domes was intended for the large Equatorial telescope from Dunecht, and the smaller dome would contain the smaller equatorial from Calton Hill. He pointed out that the disposition and character of the building was entirely governed by scientific and not architectural considerations. The main work-rooms of the Observatory were in the principal front facing the north. After walking round the building, the company entered the Transit House, where Professor Copeland said that the purpose of the department was simply for observing the time of day from the sun or from the heavenly bodies. The piers for the large instrument to be used in the room were of Dunecht granite, and weighed about 15 tons. The library, designed to contain 20,000 volumes, was inspected, and afterwards the party visited the various rooms of the building.

ENGINEERING SOCIETIES.

THE INSTITUTION OF CIVIL ENGINEERS.—At the Ordinary Meeting of this Institution on the 5th inst., Sir Benjamin Baker, K.C.M.G., Vice-President, in the chair, two papers, dealing with the Transmission of Power by Electricity, were read. The first, on "Electrical Haulage at Earnock Colliery," was by Mr. Robert Robertson, B.Sc., M.Inst.C.E., the second being by Mr. Robert Hay, M.Inst.C.E., and was entitled "Water-Power applied by Electricity to Gold Dredging."

THE INSTITUTION OF JUNIOR ENGINEERS.—On the 23rd ult. a very large number of the members of this institution availed themselves of the opportunity kindly afforded by the President (Mr. Alexander Siemens) for visiting Messrs. Siemens Brothers and Company's manufactory at Woolwich. Special arrangements had been made for their guidance over the works, which cover an area of 7½ acres, and the occasion was rendered exceedingly interesting in every way. The new and old dynamo shops, the milling, bobbin, fitters', and rubber shops, the central power and lighting station (all the machinery is driven by electric motors), the switchboard erecting room, the cable shop, tank houses, lead cable shop, cable-testing, instrument calibrating, and showrooms were seen.——On the 1st inst. a meeting of the Institution was held at the Westminster Palace Hotel, Victoria-street, Mr. Young

presiding, when a paper on "Locomotive Repairing Work" was read by Mr. A. H. Newsam Smith (member), of the Great Northern Railway repairing shops, King's Cross.

THE CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—A lecture was delivered on the 28th ult. by Mr. A. S. E. Ackermann, before the Civil and Mechanical Engineers' Society, on "Testing Machines and the Testing of Materials." The lecturer entered fully into the principles governing many of the various and well-known testing machines, and pointed out the good qualities, faults, and difficulties of working with them. Various methods of gripping and holding the specimens to be operated upon were described. This was followed by details being given of the proper method of shaping the specimens, and of measuring and recording the results obtained, and the instruments used for this purpose, particular attention being drawn to several extensometers, particularly those of Professor Unwin. Explanation was given of certain laws that it was well those making tests should bear in mind in working out results. The lecture was illustrated by samples of metals and woods that had been tested.——On the 2nd inst. this Society visited the works of the New City of London Brewery, in Upper Thames-street, E.C., and the works of the Waterloo and City Railway, now in course of construction. The members were conducted over the brewery by the company's brewer, Mr. J. B. Kibble, and their engineer Mr. W. T. Harris. The brewery is an old established one, and contains a large amount of machinery of considerable interest to engineers; the better part of the old machinery has been kept, and this is combined with modern machinery and apparatus. The members first inspected the pumping engine and well, the latter, owing to the continual lowering of the water level under London (which is at the rate of one foot a year in the neighbourhood of this brewery), has been deepened and altered considerably since it was first sunk; the particulars of this were pointed out by Mr. Harris by the aid of drawings showing various sections of the well and the strata through which it passed. Those present were then shown by Mr. Kibble the whole of the brewing process from the taking in of the grain to its final sampling. Afterwards the party proceeded to the Waterloo and City Railway works, over which they were shown, in the absence of Mr. Hay, the resident engineer, by Mr. Knowles, the contractor's engineer, who explained in detail the work that was being done, and the method of carrying it out. The length already completed of one of the tunnels, there being two, is a quarter of a mile, and their diameter is 13 ft. each. Mr. W. R. Galbraith, M.Inst.C.E., and Mr. J. H. Greathead, M.Inst.C.E., are the engineers to the scheme, and Messrs. J. Mowlem & Co. are the contractors. The machinery used is of modern date; the works are lighted by electricty, both above and below ground, and an electrically driven locomotive conveys the spoil from the face of the heading to the central shaft, where it is raised and deposited in barges alongside. The shaft, which is in the river, enables the work to be carried on without disturbing in any way the thoroughfares under which the railway burrows, and there is a considerable saving in the cost of construction by this method of working.

NEW WORKS OF REFERENCE.

WE have received from the publisher the thirteenth annual issue of "The *Electrician* Electrical Trades' Directory and Handbook for 1895" (London: Salisbury-court, Fleet-street, E.C.), which consists of three divisions—the handbook, the directorial, and the biographical. The work contains a great deal of information of use to electricians and others, and we may specially mention the articles on "Patents, Designs, and Trade Marks," "Digest of the Law of Electric Lightning," and the section devoted to short biographical notices of well-known men in the electrical world, in thirty-one instances a portrait accompanying the notice. The directory contains electric light rules and regulations of various authorities. The directory division of the work contains an alphabetical list of 7,500 names of companies, firms, and individuals.——From the office of the *Local Government Journal* (Dorset-street, Fleet-street), we have received a copy of the "Local Government Annual and Official Handbook for 1895." This is the fourth year of publication of the work, which is so full of useful information relating to local government bodies, that it is not easy to find the diary. As a local government directory, it is both complete and up-to-date, and can safely be recommended to those interested in local government. It is to be obtained for 1s. 6d.——We have received from Mr. Henry Sell, of Fleet-street, the fifteenth annual issue of his "Worlds' Press," which contains 17,000 editorial entries, and 3,700 separate newspaper announcements. The work, in addition, contains a lengthy article on British Trade, 1880-1893, and interesting articles on such subjects as "The Teaching of Journalism at the American Universities," "System in Dealing with Contributed MSS.," "Our Political Caricaturists" (with illustrations), "New Editors in 1894," "Obituary of 1894"—the two last being accompanied by portraits, "The Law of Libel as it Affects Newspapers," by Mr. W. Blake Odgers, Q.C., and other articles. The new issue is so complete that the work might be called an encyclopædia of journalism, and one idea of its compiler has evidently been to make it handy for reference. Several maps are given with the work, which is not only of use to the journalist, but must be of interest to the general reader.

TRADE CATALOGUES.

MESSRS. COLLEGE & BRIDGER, of Wolverhampton, send us an illustrated sheet of their locks. The mortise lock and roller-bolt mortise lock, of which sections are given, appear, as far as one can judge from description and illustration, to be very strong and well-constructed locks. The sheets contain illustrations and notes as to other types of locks, and also door furniture, which latter has the merit of being in good taste and without that over-ornamentation, which is the usual mistake in these cases.

Correspondence.

To the Editor of THE BUILDER.

CREWE SANATORIUM COMPETITION.

SIR,—In accordance with the invitation of the Health Committee of the Crewe Corporation, I inspected the designs sent in for the above competition, and after a protracted examination drew up the report, which I forward you herewith.

As appears therefrom, I recommended as the best design one sent in by Mr. Hampden Pratt, under the motto, "Up to Date." The Committee, however, decided to award the first premium to another design sent in under the same motto by Mr. Geo. Bolshaw. This gentleman, I understand, is connected with Crewe. I cannot but think that the better way would have been to appoint him as architect from the first, rather than invite designs from gentlemen who had not the advantage of acquaintance with the locality. In passing, I may say that both Mr. Pratt and Mr. Bolshaw are strangers to me, and that the seal of secrecy provided by the mottoes was not broken, for me, at least, until the award was published.

In view of the unsatisfactory result of this competition I have resigned my office of assessor in the competition invited by the Technical Instruction Committee of the Crewe Town Council.

FRANK GRANGER.

*** The following is Mr. Granger's report, which he wishes us to publish:—

"TO THE CHAIRMAN AND MEMBERS OF THE HEALTH COMMITTEE OF THE CORPORATION OF CREWE.

GENTLEMEN,—In accordance with your instructions I have examined the designs sent in for the proposed Sanatorium, and I beg to submit my report herewith.

The designs number sixty-three, and have been made by about the same number of competitors: in one or two cases alternative designs have been furnished by the same architects. A large proportion of the plans display great ability on the part of their authors. I have gone through the whole of the designs and reports, and have arrived at the conclusion which I lay before you, only after a careful balancing of the merits and demerits of the various schemes. Let me take one by one the tests that I have applied.

Conformity with the instructions issued December 24 and January 10 last by the Medical Officer of Health.

These have been followed by nearly all the competitors.

Fitness of the plans for the specific purposes of an Infectious Diseases Hospital.

I have excluded those designs which failed to comply with the recognised rules of hospital arrangement. For instance, in some cases the quarantine or observation wards communicated with the main pavilions.

Having thus put on one side those designs which were unsuitable altogether, it became possible to consider the important question of economy. This regards first the prime cost, second the cost of administration.

(a) Prime Cost.—I beg to point out for your careful consideration the manner in which the various estimates that accompany the plans have been arrived at. Some competitors have priced out their designs at a figure which is altogether inadequate to the character of the work they propose. On the other hand, one or two estimates are considerably in excess of the probable cost of the respective designs. In coming to this conclusion, I have been guided by my own knowledge of the relative prices of construction in London, Crewe, and other provincial towns.

I have given preference to those designs in which the accommodation required was provided with the greatest economy of space and construction. Some good designs were handicapped by the extravagantly large administration blocks. Then, again, elaborate and expensive elevations seem to me to be distinctly misplaced in a public hospital.

(b) Economy of Administration.—It is desirable that each nurse shall have under her immediate supervision all the wards in which her duties lie. Hence her duty-room should be so placed as to command all her wards. Some plans would need for their due administration a permanent addition to the staff of three or more nurses, whereas the plans I recommend to your notice can be administered properly without such addition. The annual charge for one extra nurse would of course represent a very large sum if capitalised.

Nearly all the plans for which the estimates were very high have proved to be unsuitable, in spite of their elaborate character. On the other hand, I have discovered fatal objections to some plans in which the authors had sacrificed their plans to an unnecessary simplicity. I am bound to say that, with one or two exceptions, to which I shall refer later, most of the designs with very low estimates were entirely unsuitable for execution.

At the same time, although I have not been guided exclusively by considerations of cost, I have chosen those plans by preference in which efficiency was combined with economy.

The designs which I consider to be the best are the following, taking them in their alphabetical order: 'Experience,' 'Stamp,' 'Up to Date' (2), and 'Up to Date' (3). With your permission I will now proceed to compare these four designs in detail.

The site offers facilities for future extension, and space can be left without cramping the proposed buildings, or interfering with the due circulation of air. The two plans marked 'Up to Date' are about equal in this respect. 'Stamp' is also good. At the same time 'Up to Date' (3) has shown larger extensions than the Local Government Board regulations admit, keeping in view the nearness of his other blocks and of the boundary wall.

The Scarlet Fever Pavilion should be placed on the east side of the site in order that the prevailing winds, which are from the south-west, shall not spread infection to the other buildings. 'Up to Date' (2) and 'Stamp' are the best in this respect. Dr. Thorne recommends that the main wards should have their side windows facing somewhat to the south of east and north of west. This arrangement is also best adapted to the site in respect of the prevailing winds and for the arrangement of the drainage. 'Up to Date' (2) and 'Stamp' have this arrangement.

The observation and discharging blocks should be carefully isolated from the main ward pavilions. 'Up to Date' (3) has placed his observation block too near the boundary and to the main Scarlet Fever Pavilion.

Single bed wards are provided to both main pavilions by 'Up to Date' (2) and 'Stamp.' 'Experience' has suggested them, but does not include them in his estimate. 'Up to Date' (3) provides them to one ward only.

'Up to Date' (2) and 'Experience' have the best plans in this respect. 'Stamp' provides a receiving room: this is not desirable.

The four selected plans adopt the best, namely, the east position. 'Up to Date' (2) fails, however, to provide a separate laundry for staff.

The Typhoid block should have its drainage kept as far as possible separate from the other drainage. There should be a provision for the flushing of the drains. 'Experience,' 'Up to Date' (2), and 'Stamp' provide for this in different ways. 'Up to Date' (3) shows a drain plan in which the Typhoid drainage intercommunicates with that of other blocks.

The wards are proposed to be heated with central stoves, supplied with fresh air by underground flues. In addition, low-pressure hot-water pipes are arranged round the walls. 'Stamp,' however, shows his fireplaces at the end of the wards. The foul air is extracted by means of shafts from ceiling level.

The modes of construction recommended by 'Experience' and 'Up to Date' (2) are similar in character, and would involve a like expense. I am of opinion that the estimate of 'Experience' is inadequate, and that of 'Up to Date' (2) is excessive, and that the two plans would cost the same amount in execution. 'Up to Date' (3) specifies modes of construction somewhat more expensive than 'Up to Date' (2) and 'Experience.'

'Stamp' has sent in an excellent design, but in view of the excessively high figure at which his estimate stands, I am unable to recommend this design for execution. At the same time the general excellence of his work deserves special recognition, and I beg to recommend him for the second premium.

I have felt some difficulty in appraising the design, inasmuch as he has given alternative arrangements which are not always compatible. His design and specification reveal a considerable amount of practical experience, and his plans have been very carefully thought out. I regret that his elevation is not so satisfactory as his plan. I must advert to the mode in which the cubical contents of his buildings have been attained. He only shows footings to the depth of one foot or thereabouts below the ground level, and, as far as I can judge, his dimensions have been taken from them.

'Up to Date' (2) calls for adverse criticism in only one particular, namely, the absence of a special staff laundry. His design is, to the best of my judgment, the most economical of the three. I have reached this conclusion after a careful examination of his specification. The exterior, although simple, would have a very pleasing effect.

'Up to Date' (3) would prove more expensive in execution than either 'Experience' or 'Up to Date' (2). He has provided for future extension very successfully. But for the reasons already pointed out his plan could not be carried out as it stands. Further, he has made arrangements for his drainage scheme which are altogether unsatisfactory in comparison with those of 'Experience' and 'Up to Date' (2).

As a result of the examination of these three plans I come to the conclusion that 'Up to Date' (2) is the most satisfactory in point of fitness of arrangement, possibilities of future extension, and economy.

In laying my report before you, I desire to acknowledge, with especial emphasis, the assistance I have received from Dr. H. Jones. His wide acquaintance with hygiene in all its branches has enabled me to satisfy myself on many important points in which I could not have trusted my own unaided judgment.—I remain, Gentlemen, your obedient servant, FRANK GRANGER."

THE FIRM OF PALEY & AUSTIN.

SIR,—In your Notes in the *Builder* of January 26 this sentence occurs: "Mr. Austin had been, we believe, a pupil of Messrs. Sharpe & Paley." I shall be obliged if you will allow me to correct this, as I had the privilege of being a pupil of my brother, Mr. T. Austin, and of Mr. R. J. Johnson, of Newcastle-on-Tyne, and afterwards of being in the office of Sir George Gilbert Scott for several years before I came to Lancaster to be Mr. Paley's partner. HUBERT J. AUSTIN.

The Knoll, Lancaster, March 4, 1895.

CARTAGE *v.* RAILWAY TRANSIT.

SIR,—Manufacturers are sometimes subjected to very serious loss of trade through being unable to obtain promptly rates of carriage from their works to places where their customers require to use the goods, notwithstanding that the destination has a railway goods depôt, and that the traffic is offered in full truck-loads and at "owner's risk" in transit.

Recently a London firm of merchants wanted a price "in railway trucks at Poplar." The traffic manager at sending wrote that Poplar would probably be 50 per cent. more than to London only. G.W.R., Paddington office, reply that "no rate exists," and that "the traffic can be conveyed much cheaper across London by cart to Poplar."

I presume that if the traffic were offered from ship at Poplar, rates of carriage would be found between that point and any railway depôt in England. My customers have been waiting three weeks for a definite reply, but unless they will cart across London the trade is taken out of my hands in face of the fact that the sending railway company has a depôt at the required destination.

Surely this is a question for railway shareholders, seeing that it is necessary to have consistent rates of carriage to enable manufacturers to fully develop and extend their trade.

My firm can put hundreds of tons more traffic on the railway yearly at their works if their interests were considered in the matter of railway carriage rates.

Rates are often prohibitive, and I am assured that my firm's traction-engine can deliver our goods at fifty miles from the works, by road, cheaper than the cost of railway transit at existing rates. This will doubtless be put to practical test during the coming summer. REUBEN CULL,

(Agent for Charlton Lime Company).

London, March 6.

The Student's Column.

BRICKS AND TERRA-COTTA.—X.

BASIC BRICKS.

WE have seen that in order to render a tolerably pure siliceous earth suitable for the manufacture of fire-bricks it is necessary to add a small proportion of lime or other similar material as a flux. Silica, in itself, is infusible, and the lime was to be added in such proportions as would just melt it. Then, in the last article, we discussed the relative proportions of ingredients of known chemical composition to be mixed with certain classes of brick-earth to render it fusible but not fluid. Now we shall say something concerning the ingredients and manufacture of bricks composed almost entirely of lime, or basic bricks as they are termed. These are used for lining Bessemer converters and cupolas, amongst other things.

The practice of making lime bricks dates back several years, and it is only in comparatively recent times that an altogether satisfactory product could be obtained. Lime, as we know, is infusible, but it never exists on the large scale without forming part of some compound, and is usually found as the carbonate. In conjunction with carbonate of magnesia it constitutes the substance known as magnesian limestone. An almost insuperable difficulty exists in the manufacture of bricks of such materials in that, on heating, carbonic acid is driven off, leaving the base behind; and naturally, the material as a whole loses considerable weight and shrinks very much. It is estimated that the loss of the acid, plus moisture dried out, leads to its reduction in weight of from 40 to 45 per cent., and the shrinkage is from 25 to 35 per cent. To use either limestone or magnesian limestone satisfactorily, therefore, was impossible.

Neither could quicklime be employed without special preparation in the manufacture of basic bricks, as it will not mix with water without a strong chemical reaction taking place, moreover it is too pulverulent in its character to ever become plastic in the strict sense of the term. Nevertheless, with other fluids than water it becomes more tractable. It occurred to Mr. Edward Riley, about 16 years since, that if some cheap fluid could be employed that had no chemical action on the lime it would be possible to mould the latter either by ramming or by pressing it into moulds. Various liquids were tried in turn, such as crude petroleum oil, coal oil and resin oil, all of which answered very well. In burning, the petroleum, &c., passed off, leaving bricks of solid lime. When this material is burned at a low to a bright red heat no contraction takes place; when subjected to a much higher temperature, however, it contracts to a small extent. Mr. Riley experimented with many varieties of lime and experienced no difficulty in making perfectly solid bricks and cylinders. The only precaution necessary was to see that the lime was well burned, and that it had not been exposed long to a damp atmosphere.

The next step was to ascertain the effect of other solid mineral substances on the lime; and various mixtures of burned clay and iron oxide were dealt with. In the end it was found that from 5 to 7½ per cent. of burned clay made the lime, &c., much harder after burning. An admixture of from 3 to 5 per cent. of oxide of iron was also found to consolidate the lime, whilst it increased the shrinkage.

In the manufacture of bricks, the lime was at first submitted to a pressure of about one ton per square inch. That used was obtained from Huddlestone stone, a magnesian limestone of much repute for building purposes. Direct experiment showed that it was far preferable to use hydraulic pressure than to pound the material in a mould, as this latter process rendered the upper part of the brick rather scaly. Basic bricks made from ordinary Sheffield lime may, when burned at a high temperature, be steeped in water without slaking. The following is the chemical composition of bricks of that lime after burning:—

Chemical Composition of Basic Bricks.

Silica	8·85
Lime	51·80
Magnesia	35·35
Alumina	2·60
Peroxide of iron	1·40
Calcium sulphide	·55
	100·55

The bricks being pressed perfectly true and square, can be built almost without mortar or other cement for the joints.

GLASS SAND BRICKS.

It has recently been ascertained that a very superior quality of brick may be manufactured from the waste sand derived from grinding and polishing plate-glass, in the United States and elsewhere. The grinding of plate-glass is accomplished by means of wooden plates covered with iron, between which and the glass to be ground quartz sand, abundantly moistened with water, is brought. By this method, the quartzose grains become mixed with particles of iron and glass, and, after losing its sharpness, the material is cast aside as waste. The sand is found to contain* about 15 per cent. of glass particles and 2 per cent. of iron, is very hygroscopic, and, before it can be used for making bricks, is dried, and then pressed into the mould under a pressure of 660 lbs. per ·155 sq. in. This material is then subjected to a temperature of over 2,500 deg. Fahr., when the glass enters into combination with the sand. The bricks thus produced have a specific gravity of only 1·5, and are perfectly white; and, as they are not materially affected by acids, are of much use in chemical factories and sulphuric-acid works.

Glass "bricks" are now being manufactured in Switzerland, formed or moulded flask-shape with a short neck at each end. They are 8 in. in length, 6 in. in width, and 2½ in. in depth, with an air-hole or chamber running through the centre. The edges of the brick are covered, recessed or ribbed and grooved to receive, when laid, a suitable cement of plastic material of such character that, after it has hardened, it will constitute a suitable frame or setting to keep the entire mass, roof or wall, solidly together. They are of sufficient strength to withstand a pressure of from 150 lbs. to 200 lbs. per square foot.

IRON BRICKS.

A new product, called "iron brick," comes from near Saarbrück, Germany. It is made by mixing equal proportions of finely-ground red clay-slate with fine clay, and adding 5 per cent. of iron ore. This mixture is then treated with a 25 per cent. solution of sulphate of iron, together with a certain quantity of finely-divided iron ore. It is then moulded in a press, dried, dipped once more in a nearly concentrated solution of sulphate of iron mixed with the finely-divided ore, and then baked for forty-eight hours in oxidising flame, and twenty-fours in the reducing flame. The bricks are said to be highly satisfactory for special building purposes; the German governmental testing laboratory has reported very favourably on them.

KIESELGUHR BRICKS.

These somewhat novel materials, which have been in the London market for a few years, are made from infusorial earths, and although primarily intended as fire-bricks, are, on account of their low specific gravity (0·6) of much use for vaulting and the like, also. They are specially valuable for blast-furnace pipes, covering retorts, &c., and have been employed with much success in chemical works and other buildings where non-conducting properties are desirable. A cubic yard of Kieselguhr brickwork weighs about 12 cwt., about ⅓ the weight of that made of ordinary fire-bricks. The following is a chemical analysis of this infusorial earth:—

Chemical Composition of Kieselguhr.

Silica	83·8
Lime	·8
Magnesia	·7
Alumina	1·0
Oxide of Iron	2·1
Organic Matter	4·5
Moisture and loss	7·1
	100·0

From the above, it will be seen that the bricks are of a highly siliceous nature. We have had no opportunity of examining the raw earth, but if it is correctly described as "infusorial" (which might have about the same chemical composition as that above given), it would be made up chiefly of the frustules of diatoms, a very lowly-organised group of marine plants, which possess siliceous skeletons.

SLAG BRICKS.

These are not bricks, if that term be restricted to burned or roasted products; at the same time, a few words on slag "bricks," which have been extensively employed in some parts of the country, will not be out of place. They have been made in large quantities at Middlesbrough by a process which may be briefly described as follows.

Slag is run off from the furnace into a machine in which water keeps up a constant circulation, and, by being brought into direct contact with the water, the slag is immediately converted into sand. This is mixed with a certain quantity of selenitic lime, with an addition of iron oxide. The preparation of the lime forms an essential part of the process. It is made in the following manner, though we do not know whether the precise proportions have not been modified during the past few years:—80 per cent. of unslaked common lime, 10 per cent. of raw

* "Mineral Resources of the United States." 1893. p. 608.

gypsum, and 10 per cent. of iron oxide calcined. These are all ground into a fine dry powder, after which the composition is passed through a sieve of very fine mesh. To each 1,000 bricks 6 cwt. of this composition is used. It is then passed into a brick press, and the bricks are subsequently removed to air-drying or hardening sheds. No water is added before the material is pressed, sufficient being held in suspension, as it were, in the slag sand to thoroughly moisten the lime. In fact, it was no uncommon thing to find that a small stream of water flowed from the press as a result of the squeezing to which the sand was subjected.

The bricks thus produced are very tough, though they might merely be regarded as a form of cement. As a matter of fact, with the exception that the bulk of the material is made of slag-sand instead of sand produced by Nature, we can see no difference between these "bricks" and cement blocks that have been compacted by pressure. They are chemically composed as follows :—

Chemical Composition of Slag Bricks.

Lime	29·90
Silica	25·15
Alumina	21·80
Protoxide of iron	1·44
,, ,, manganese	·26
Peroxide of iron	1·66
Magnesia	5·10
Potash	·53
Soda	·36
Sulphur	1·00
Sulphuric acid	1·25
Phosphoric acid	·01
Carbonic acid	2·60
Water	9·50
	100·56
Less oxygen of the lime combined with sulphur	·50
	100·06

It is not difficult to see that the slag-sand was essentially composed of silicate of alumina, plus small proportions of lime, magnesia, and sulphur. The material, being spongy, is very compressible; but the principal point to be attended to in the manufacture of slag-bricks is great care in mixing the lime in definite proportions with the sand—too much lime tends to burst the bricks, whilst too little materially affects the hardening.

Many other kinds of "bricks" are made from refuse of manufactories, but generally on a small scale, the works, as a rule, being of a somewhat ephemeral character.

OBITUARY.

REV. EDMUND VENABLES.—The Rev. Edmund Venables, percentor and canon residentiary of Lincoln, died on Tuesday. The deceased was a well-known archæologist, and he wrote extensively on architectural subjects as well.

MR. J. H. POWELL.—The death is announced of Mr. John Hardman Powell, the artistic head of the firm of Hardman & Co., of Birmingham. Mr. Powell was a pupil and afterwards son-in-law of Augustus Welby Pugin, who was associated with the late John Hardman in the Gothic revival of 1855 and subsequent years. Mr. Powell, who carefully preserved the spirit and traditions of his masters, was especially happy in window designs. Among his best works are windows in Worcester Cathedral, St. Chad's and St. Martin's, Birmingham, and the church recently erected by the Duke of Norfolk at Norwich.—*Leeds Mercury.*

MR. ALFRED GILES.—Mr. Alfred Giles, C.E., died on the 3rd inst. in his 79th year. In 1889 he was vice-president of the Institute of Civil Engineers.

GENERAL BUILDING NEWS.

PROPOSED HYDROPATHIC ESTABLISHMENT, RHYL.—A syndicate of Manchester gentlemen have purchased a quantity of land on the Morwylfa Estate at Rhyl, on which it is intended to erect a hydropathic establishment. Messrs. Darbyshire & Smith, of Manchester, are the architects, and the contract has been let to Messrs. W. Brown & Sons, of Salford.

NEW CHANCEL, CHRIST CHURCH, LINTHWAITE.—The new chancel of Christ Church, Linthwaite, was on the 2nd. inst. consecrated by the Bishop of Wakefield after undergoing considerable alterations and improvements, which, together with the new chancel, have been carried out from designs and plans by Mr. C. Hodgson Fowler, of Durham. The cost of the addition and alterations, including a new organ, is about 2,500*l.*

INFIRMARY, PAISLEY.—The plans of a new infirmary for Paisley have been prepared by Mr. T. G. Abercrombie, architect, Paisley. The building is to be erected on a site at Egypt Park, Calside, and will generally consist of two stories and attics, with the front portions of the wings, and also the central block, slightly jutting out from the main building. The long part of the main building on the ground floor, running from east to west, is to contain the corridors. In the centre of this main building there is to be the administrative block at which will also be the main entrance, and the projecting wing at the east end will be of the form of a rounded building, containing circular wards, whilst a smaller building at the west wing will have the sick nurses' rooms on the ground floor and the doctors' bed-rooms above. On the north side of the circular building there will be a circular ward for twelve boys, with duty-room, day-room, bath-room, &c., and a ward containing sixteen beds for female medical cases is to be on the ground floor with recreation rooms, verandah, &c., and on the south side of the corridor there is to be a circular ward containing twelve beds for girls, having all the ordinary conveniences. A small structure is to project from the corridors between the central and western pavilions, and it is to contain, on the ground flat, doctors' and nurses' dining-rooms, a chapel and chaplain's room being on the first floor. The spaces between the three pavilions are to be preserved as airing-grounds for the patients, the males and females having separate grounds. On the ground plan of the central or administrative block there will be the vestibule and hall, porters' rooms, visitors' room, and doctors' room, and leading from the hall is a stair to the board-room, committee-room, and sitting-rooms on the first floor. A structure which forms part of this block has the casualty ward on the basement floor, the matron's apartments on the ground floor, and on the first floor will be the operating-room, the anæsthetic-room, and testing-room for the medical men. Entrance to these various apartments will be from the corridors. In the attics, which will be confined to the main line of building, the servants' rooms, kitchen, &c., are to be located. The cost of the hospital will, it is expected, be over 60,000*l.* In addition to the hospital, a nurses' home is being erected within the grounds.

CHURCH SCHOOLS, ROCHDALE.—The new Parish Church Schools at Rochdale were opened on the 2nd inst. The new buildings, which are from the designs of Mr. Henry Lord, of Manchester, are situated near the railway station, at the corner of Lower Tweedale-street and Coventry-street, and they provide accommodation for 468 boys and girls. Seven class-rooms are arranged on either side of a central hall, 74 ft. by 31 ft., and at each end the teachers' rooms, cloakrooms, and lavatories are placed. The structure is carried out in red brick and terra-cotta. Exclusive of the site, which has been presented, the cost of the building and furniture amounts to 7,435*l.*

HIGH SCHOOL FOR GIRLS, BRIXTON.—A new school for girls has just been opened in Wavertree-road, Streatham Hill. The new buildings include, beside separate class-rooms for all forms, a large hall, kindergarten-room, studio, laboratory, and music-rooms. The school has been erected under the supervision of the architect (Mr. J. Osborne Smith), by Messrs. W. Johnson & Co.

HALL, COATDYKE, LANARKSHIRE.—On the 2nd inst. the new hall erected by the Good Templars of Coatdyke was opened. The hall, which was designed by Mr. Thomas Smith, architect, Coatbridge, is in the Renaissance style, and has sitting accommodation for over 400 people. There are the usual anterooms and lavatories on the ground floor, and above these is a reading and recreation-room.

THE THEATRE ROYAL, GLASGOW.—It is proposed to erect a new theatre on the site of the Theatre Royal, Glasgow, which has just been destroyed by fire. Mr. Phipps visited Glasgow a few days ago, and made a thorough examination of the theatre, with the view to preparing plans for the new building. At a full meeting of the directors it was arranged that Messrs. Howard & Wyndham shall construct a new theatre on the site of the Theatre Royal, Glasgow, and hand it over on completion to the company.

FOREIGN AND COLONIAL.

FRANCE.—The fifth exhibition of the Société Internationale de Peinture et Sculpture has just opened in the Georges Petit Gallery.——At the Musée Galliera an interesting Exhibition has been opened of seventy-eight portraits of women painted by masters of the French school, such as MM. Bonnat, Bouguereau, Carolus Duran, Gervex, Roybet, Jules Lefebvre, &c. —— An extra-parliamentary committee has been commissioned to take in hand the organization of the services of "Bâtiments Civils," and Palais Nationaux."——A Hôtel de Ville has been built at Levallois Perret, at a cost of 840,000 francs.——The "Ouest" Railway Company has demanded, in connexion with the 1900 Exhibition, a concession to make a new line between Courcelle, Passy, and the Champ de Mars, intended to duplicate the line from Auteuil.——The Lyons Fine Art Society will open its annual exhibition on April 8, to close on June 9. The exhibition is open to foreign as well as French exhibitors.——The Municipality of Lyons has sent to Chamounix an expedition of engineers of the Ponts et Chaussées Department to inquire into the possibility of getting water from the Arve, and from other sources among the glaciers of the Alps, to be taken to Lyons by an aqueduct system.——The work of consolidating and strengthening the Temple of Diana at Nimes is now completed. The repairs were carried out under the direction of M. Revoil, the architect acting for the Commission des Monuments Historiques, with care to avoid any unnecessary interference with the architecture of the temple. The ancient building has been made the receptacle for a curious collection of remains of statues, &c., sent by M. Perrot.—— The monument executed by M. Roulleaux, sculptor, to the memory of President Carnot, for the Place de l'Hotel de Ville, at Nolay, consists of a white marble pedestal, decorated with symbolic objects and an inscription, surmounted by a group representing the President at the moment when he received the fatal blow. Behind is a figure of France receiving him into her arms.——The death (at Paris) is announced of M. Albert Porcher, landscape painter, and a pupil of Lambinet, who had been a constant exhibitor at the Salon for the last twenty-five years. ——We have to record also the death of M. Maurice Antonin Dormoy, architect at Bar-sur-Aube, at the age of 73. He was at first attached as architect to the Department of Assistance Publique, at Paris. He was also one of the architects to the "Monuments Historiques," and connected for a long time with the Société Centrale.——The Department of Fine Art at Paris will shortly send to Lyons the paintings by Léon Comerre to decorate the Salle des Fête of the Prefecture of the Rhone, These paintings include a ceiling representing the Triumph of Venus, two tympanum subjects, one representing the Rhône and the Saône, the other the City of Lyons, enthroned and attended by Arts and Industries, a view of the city of Lyons forming a background to the whole.

MISCELLANEOUS.

A SOCIETY OF SANITARY INSPECTORS.—A meeting of representatives of several societies of Sanitary Inspectors for the purpose of considering the question of the formation of a Society of Sanitary Inspectors embracing London and the Provinces, was held at Stafford on February 23. The following societies were represented: North-Western Liverpool, Manchester, Yorkshire, Western, and Staffordshire. Dr. Reid occupied the chair, and resolutions were carried unanimously to the effect that a Society of Sanitary Inspectors, embracing London and the Provinces, should be formed; that the chairmen and secretaries of the various bodies represented at this conference, and also the chairman and secretary of any other sanitary inspectors' society approving of the movement, should be elected as an organising committee to prepare a scheme for the formation of the new society, and frame rules and regulations for its government, which should be embodied in a report to be presented for approval at a general meeting of members of the various societies to be held at a place and time to be determined by the committee; and that, with a view to the absolute unity of the Sanitary Inspectors of the kingdom, the secretary forward a copy of the resolutions passed to the secretary of the Incorporated Association of Sanitary Inspectors, and to the secretary of any other inspectors' association, the existence of which he might become cognizant of.

ELECTRIC LIGHTING.—The new printing works of the Geraldine Press, 21, Whitefriars-street, Fleet-street, E.C., and also the block of offices belonging to "Answers," Limited, 24, Tudor-street, E.C., are lighted throughout by electricity, the current being produced in the basement of the works of the Geraldine Press by a compound wound direct-current dynamo, built by Messrs. Crompton & Co., and driven direct by an engine made by Messrs. Belliss & Co., of Birmingham. About 190 lamps have been installed in the works, and about 80 lamps in Tudor-street, and the lighting of both premises is controlled from one switchboard fixed close to the dynamo. The large Hoe machine used for printing "Answers," and also the Marinoni machines used for printing the large number of other papers published at the same offices are lighted up internally by incandescent lamps which much facilitate work. The wiring of the buildings was carried out by the Electrical and General Engineering Co., of 86, Leadenhall-street, E.C., under the supervision of the Consulting Engineer. Mr. E. R. Dolby acted as Consulting Engineer for the whole.

REPLY LETTER CARD.—A convenient letter card has been brought out by Messrs. Beeching & Son, which in its first state forms a sealed letter for the question, while a portion of it is perforated for tearing off and using as a postcard for the reply. The advantage is that the question is sealed, the card forming a halfpenny packet open at the ends (opened by the usual perforation method); the answer alone is open.

A NEW SET-SQUARE.—Mr. F. R. Lawson, of Fenton, Staffordshire, sends us a new set-square, which he has patented, made of transparent xylonite. By means of two slits cut in this, wide enough for a pencil to work through, the same set-square will give three different angles, 60 deg. (or 30 deg.), 45 deg., and a $\frac{1}{4}$ deg. pitch for roofs, these being chosen as the three angles most in use. To make one set-square do the service of three is certainly an economic benefit to draughtsmen.

THE "SANITARY" SINK COVER.—Messrs. Leete, Edwards & Norman send us a specimen of this invention, which consists of a perforated galvanised

metal conical cap for the top of a sink, waste, or drain-pipe, in which is fixed a block of material of a disinfecting character, by which it is proposed to disinfect liquid passing down and air passing up. One block is sufficient for about two months' use, and can be renewed at a cost of 9d., 1s., or 1s. 6d. per half-dozen blocks, according to the size of cover employed.

PAINTERS' DISPUTE IN DOUGLAS, ISLE OF MAN.—A dispute as to wages is going on between members of the Douglas Operative Painters' Association and the masters, originating in a demand about five months ago by the former for an increase of wages during eight months of the year from sixpence to sevenpence an hour, and the existing rate of wages to be retained during the other four months. Owing to the masters wishing to enforce certain rules which were objected to by the men, it was resolved at a meeting of the Painters' Association on February 27 to strike on March 1, failing the concession of the sought for advance.

APPOINTMENT OF VALUER.—The Local Government Board have officially appointed Mr. James Green (of the firm of Weatherall & Green, London), as valuer under the Manchester Corporation Act, 1894.

BUILDING TRADES COMPETITIONS.—It is understood, says the *London Technical Education Gazette*, that in connexion with the forthcoming Building Trades Exhibition, to be opened on March 25 at the Agricultural Hall, there will be competitions among British workmen in the following trades—masonry, bricklaying, carpentering, joinery, plastering, smiths' work, plumbing, decorating, &c., and that silver and bronze prize medals will be awarded to the successful competitors. The arrangements for the competitions have been made by a committee of architects, and the judges will be nominated by the Royal Institute of British Architects, the Worshipful Company of Plumbers, the Institute of Builders and the Clerks of Works Association. The competitions will take place on Saturday, March 30. Particulars may be obtained from Mr. H. Greville Montgomery, of 222, Strand, W.C., who will also make special arrangements for the admission of members of classes in building construction and the building trades to the exhibition on receipt of applications from the secretaries of the schools.

THE JEWRY WALL, LEICESTER.—The new line of the M. S. and L. Railway Company through Leicester may, says the *Leicestershire Advertiser*, render the destruction of the Jewry Wall necessary. The matter has been taken up by those who desire to preserve such a historical relic, and pressure is being brought to bear on the company and the corporation. At the annual meeting of the Leicestershire Architectural and Archæological Society the question was considered, and on the proposition of Major Freer, seconded by the chairman (the Rev. A. M. Rendell), the following resolution was carried unanimously:—"That the Manchester, Sheffield, and Lincolnshire Railway Company and the Leicester Corporation be memorialised to preserve the Jewry Wall intact, and that the committee and the hon. secretaries be empowered to take any future steps that may be necessary in order to preserve this interesting relic of Roman Leicester."

HOLYROOD ABBEY AND PALACE.—On the 28th ult. Mr. W. W. Robertson, of H.M. Board of Works, delivered a lecture on "Holyrood Abbey and Palace," in Queen-street Hall, Edinburgh, under the auspices of the Photographic Society. Mr. Robertson described (1) the ruined fragment of the old Abbey, now known as the Chapel Royal; (2) the great tower built by James IV. of the old palace; and (3) the palace erected by Charles II., representing the bulk of the buildings. One great charm of the ancient Abbey was, he said, that most of what was to be seen was genuine old work. The onlooker was face to face with the old builders. Mr. Robertson next described the other two portions of the buildings, and said their surpassing interest lay in the way in which they linked the Scotland of today with centuries long past.

THE FUTURE DEVELOPMENT OF PLUMBING.—Mr. Peter Fyfe, chief sanitary inspector of Glasgow, delivered a lecture recently, in the Waterloo Rooms, Glasgow, under the auspices of the local District Council of the National Registration of Plumbers. The subject of the lecture was "The Plumber: His Present Position and Future Prospects." After mentioning that there are in Glasgow 239 master plumbers, employing 862 apprentices, Mr. Fyfe said the plumber from being a tradesman had become a health protector or a health destroyer, and it was gradually dawning on the minds of men in authority that bad, careless plumber work involved not discomfort only, but might be death to the citizen. No one should be entrusted with work who had not a full knowledge of its principles. The present position of the plumber in that respect was admittedly unsatisfactory. Speaking of the part he expected plumbers to play in future developments, Mr. Fyfe gave a description of the steam-heating system in New York, where the charge for heating 1,000 cubit feet of space during 182 days of the cold season was 9s. 6d. In this country the system could be worked supplying the heat at two-thirds less price. At present the cost of heating a single apartment by coal in an open fire was 1*l.* 9s. 1d. It was time for capitalists and municipal authorities to look at this great question of central steam stations, both for sanitary and financial reasons. Mr. Fyfe also outlined a system under which the city refuse at present burned might be utilised in electric lighting, and described the use of compressed air for motive power at present in operation in Paris. In the development of these systems in this country the plumber, he expected, would play an important part. In the future prospects of the plumber lay embedded in great measure the realisation of the dream of to-day—the city of comfort and health. Mr. Fyfe was thanked for his lecture.

THE CASTLE BROMWICH ROADS.—The Castle Bromwich Rural District Council have called in Mr. J. E. Willcox, C.E., of Birmingham, to prepare plans, make an inspection, and report on the whole of the roads in the several parishes within the district, with a view of ascertaining the state of the roads and what repairs are necessary to be done before they are taken over by the Council.

DIOCESAN SURVEYORSHIP OF ST. ALBANS.—We seem at last to be in possession of the facts in regard to this appointment, about which we have received conflicting accounts. It now appears that there were two vacancies, to one of which Mr. Trevor Davys, as already stated, has been appointed, to the other Mr. A. Blomfield Jackson; but in the latter case with the reservation that the surveyor now in office completes certain works already in his hands.

LEGAL.

AN ARCHITECT AND THE BUILDING OWNER:

A QUESTION OF AGENCY.

THE case of Allatt *v.* Gomersall came on the 1st inst. before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Lopes and Rigby, it being the appeal of the defendants from the judgment of Mr. Justice Charles, dated December 14, 1894, at a trial without a jury at Leeds.

Mr. Wallace, Q.C., who appeared for the appellants (the defendants), said that the action was one brought by a builder against the owners of a property on which cottages were being built, and the subject matter of the action was certain specifications omitted from the quantities for work to be done under a contract.

It appeared that the defendant's architect, a Mr. Ellis, inserted an advertisement in certain papers asking for tenders for the different parts of the work, which was in connexion with the building of fourteen cottages in Churchfield-lane, Castleford, near Leeds, and the plaintiff sent in a tender to Mr. Ellis, in which he undertook to do the excavations, the masonry and brickwork for Messrs. Gomersall, according to the quantities, for 1,540*l.* The tender was submitted to the defendants and accepted, and a contract was entered into. In the course of the work it was discovered that certain things which should have been mentioned in the quantities had been omitted. However, the work was completed, and then the plaintiff claimed for the extra work 170*l.*, but the defendants refused to pay on the ground that the plaintiff had contracted to do the work for the lump sum of 1,540*l.*, and that they were not responsible for any mistake in the quantities submitted by the architect.

The Master of the Rolls said that if a man sat down at a table and wrote out the specifications and quantities himself for his own houses, and sent them to a builder for him to tender for the work, and the builder so tendered, surely he would be responsible for any omission. Further, if a man instead of getting out specifications and quantities himself told his architect to do it, the architect would be his agent, and he would be responsible for the architect's omission. Besides, it appeared from the evidence that several persons swore that it was the custom of the architect to act as the agent of the building owner.

Mr. Wallace replied that it was contended for the defendants that the architect was not their agent, and that if he were the agent for anybody it was for the builder; that it was no part of his work as architect to the owner of the property to make out the specifications on which tenders were to be solicited. He said that the position was this. The defendants said to the architect, "We want these houses put up for so much——"

The Master of the Rolls said that the learned counsel must not say that, because it was not so. If the houses were to be put up for a certain definite sum, the advertisements asking for tenders would have been differently worded.

Mr. Wallace replied that the object of getting tenders was to get a thing done as cheaply as possible; if possible at a less price than that contemplated.

The Master of the Rolls called attention to the fact that there was evidence that when the omissions were discovered the matter was brought before the notice of the defendants, and that the defendants thereafter allowed the work to go on.

Mr. Wallace replied that if their Lordships found that as a fact it would be fatal to his case.

Their Lordships dismissed the appeal with costs, the Master of the Rolls in his judgment stating that there was no necessity for them to go into the legal aspects of the case, as when the omissions were discovered, the defendants got the builders to go on, and that amounted to a new promise on the defendants' part.

APPEAL BY THE LONDON BUILDING TRADES FEDERATION:

IMPORTANT DECISION.

ON Tuesday and Wednesday last in the Court of Appeal, the case of Trollope & Sons *v.* the London Building Trades Federation was argued before Lord Halsbury, Lord Justice Lindley and Lord Justice A. L. Smith. It was the appeal of the defendants J. Verdon, secretary of the Federation, and others, from an order of Mr. Justice Kekewich, made in February last, by which he restrained the defendants from the further issue of a yellow poster called "Trollope's Black List," and which it was said by the plaintiffs was prejudicial to their interests as builders and contractors. Mr. W. S. Robson, Q.C., and Mr. Jenkins appeared for the appellants; and Mr. Renshaw, Q.C., and Mr. Butcher, M.P., for the respondents, the plaintiffs.

The circumstances of the case, as stated by Counsel, were that in October Messrs. Trollope were carrying on certain building operations in Park-lane and Grosvenor-square, W., when a dispute arose among the workmen as to the employment of two foremen named Eves and Iliffe. They demanded their dismissal on the ground that they had previously worked against the interests of the Federation. The defendants said that if the plaintiffs refused to comply they would call the men out. The plaintiffs did so refuse, and in keeping with the defendants' threat, about 175 workmen left the plaintiffs' works, though about 500 men remained. This was on November 1st. The works were afterwards picketed, and though no disturbance happened, the protection of the police had to be sought to prevent possible mischief. It was then that the "Black List" complained of was published. It contained the names of the men, most of them non-unionists, who remained at their posts, and it was said to be intended as a warning against their future employment at all works where union laws were in vogue, and against loyal unionists working side by side with them.

Lord Halsbury asked if the "Black List" was so described?

Mr. Robson: Yes, my Lord. It is said of these men who were working "black" that they were men who had refused to comply with the regulations of their trade.

Lord Halsbury said he supposed they were what were called "blacklegs," though the Court of Exchequer did not know what a "blackleg" was. It had no literal meaning.

Mr. Robson: No, my Lord. It carries with it the meaning that he is working against his union.

It was pointed out that in 1892 it was agreed between the masters and men in the building trade that the masters should not treat it as a disqualification to men seeking employment that they were trades' unionists; and, on the other hand, that trades' unionists should consent to work with non-unionists.

Mr. Robson further argued that the defendants had done no more than exercise their legitimate right to maintain a fair standard of wages and the regulations of the building trade. This being their ultimate object they were entitled to do it, even though it injured those against whom their efforts were directed, if there were an absence of malice.

Lord Halsbury observed that Mr. Robson's argument appeared to support what was known in modern language as boycotting.

Mr. Jenkins followed on the same side.

Mr. Renshaw, Q.C., for the plaintiffs, said the poster proved a wrong done, and in an interlocutory matter of this sort he had only to make out a *primâ-facie* case to get the Court's confirmation of the decision of the learned Judge in the Court below. The issue of the poster was tantamount to an interference with the lawful calling of the plaintiffs.

Mr. Butcher having also argued in support of the respondents' case,

Lord Halsbury, in giving judgment, said they encountered considerable difficulty in expressing an opinion on the material issues to be tried. There were grave questions of law and fact involved, and they found that in the dissemination of these placards the defendants had shown an excess in their method of publication. There was a *primâ-facie* case made out, and as the defendants had declined to give an undertaking to cease the continuance of this publication till the trial, they saw no reason to interfere with Mr. Justice Kekewich's order. The appeal would accordingly be dismissed with costs.

Lord Justice Lindley: I have nothing to add except to say that this is an attempt to force our hands, and we will not be forced.

Lord Justice Smith concurred.

MEETINGS.

FRIDAY, MARCH 8.

Institution of Civil Engineers (Students' Meeting).—Mr. A. Struben on "The Co-ordinate System of Surveying as Employed in South Africa." 8 p.m.

Royal Institution.—Professor A. W. Rücker, M.A., F.R.S., on "The Physical Work of von Helmholtz." 9 p.m.

Sanitary Institute (Lectures and Demonstrations for

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Infectious Diseases Hospital	Penzance Town Coun.	31*l.* 10*s.* 21*l.* and 15*l.* 15*s.*	Mar. 19
*Cottage Homes and Schools	Chorlton Union	75*l.* 50*l.* and 25*l.*	April 20
*Shops, Offices, Two Hotels, &c. Preston	N. Miller	150*l.* 100*l.* and 50*l.*	May 27

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Sewage Works	Bacup Corporation	G. Wilson	Mar. 9
*Works and Materials	Lewisham Bd. of W.	*Official*	Mar. 12
Widening Road, &c. Llanishen	Llandaff High. Board	Jas. Holden	do.
Cookery Centre, Greenhill School	Harrow (U.D.) Sch. B.	Houston & Houston	do.
House, Downdinner Hill, Whitby	Capt. J. Smith	J. J. Milligan	do.
Floating Bath, Clifton Scope	York Corporation	A. Creer	do.
Additions, &c. to Schools, Abergwynfi and Cymmer, Neath	Glyncorrwg Sch. Bd.	*Official*	do.
*Works and Materials	Tottenham U.D.C.	do.	do.
*Making-up Roads	Fulham Vestry	C. Botterill	Mar. 13
Improvement Works, Grantham-road	Halifax Corp.	E. R. S. Escott	do.
Nine Houses, Outbuildings, Walls, &c. Lower Wortley-road, Leeds	.....	H. B. Buckley	do.
House, Main-road, Windermere	J. Bell	Robt. Walker	do.
*Works and Materials	Hackney Vestry	J. Lovegrove	do.
*Schools, Lower Dovercourt	Harwich School Board	J. W. Start	Mar. 14
House, Grove Park-road, Weston-super-Mare	.....	Price & Wooler	do.
Sewers and Water Mains, Passage West	Cork Union	*Official*	do.
Road (740 yds.), Nantmelyn	Aberdare U.D.C.	do.	do.
*Offices, Bedford; Cleaning, &c.	M. R. Co.	do.	do.
Granite Road Metal	Desborough U.D.C.	W. T. Streather	Mar. 15
Broken Granite (12,500 tons), &c. Wisbech	Isle of Ely C. C.	G. J. Moore	Mar. 16
Alteration, &c. to Chapel, Bamford, near Rochdale	Rev. J. Hall	.....	do.
Additions to National Schools, Clayton, Yorks	.....	S. Spencer	do.
Seven Houses, Newhey, Rochdale	Exors. of R. Milne	Butterworth & Duncan	do.
Making Harbour	Colliestown (N.B.) Harbour Trustees	A. Melville	do.
Forming Streets and Passages	Warrington Corp.	Thos Longdin	Mar. 17
Twelve Houses and Store, Albert-road, Beech, Yorks.	Sowerby Bridge Indus. Soc. Lim.	M. Hall	Mar. 18
Club Premises, Waterfoot, Lancs.	Liberal Club	.....	do.
Main Outfall Sewer, Whittington	Upper Stour Valley Main Sewerage Board	E. B. Marten & W. Fiddian	do.
Public Abattoir, Brook-street North	Preston Corporation	*Official*	do.
*Supply of Coal	Corporation of London	do.	do.
*Works and Materials	St. Giles Bd. of Works	do.	do.
*Construction of Sewers	do.	G. Wallace	do.
*Asphalte Paving	do.	do.	do.
Sewage Purification Works, Whalley	Clitheroe R.D.C.	Jas. Diggle	do.
Stoneware Pipes, Manholes, &c.	Llandudno U.D.C.	E. P. Stephenson	Mar. 19
Railway Station, Rhymney Junction, Glam.	G. W. R. Co.	*Official*	do.
*Two Settling Tank and Filters, &c.	Southall - Norwood U.D.C.	do.	Mar. 20
Setts, Channels, Flags, &c.	St. Helen's (Lancs.) Corp.	G. J. C. Broom	do.
Sewerage Works (5,270 yards)	St. Ives (Cornwall) Corp.	E. Cousins	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Store Buildings, Siddal	Halifax Indus. Soc.	Horsfall & Williams	Mar. 29
Five Shops and Showrooms, Pellon-lane, Halifax	.....	C. F. L. Horsfall & Son	do.
*Paving Works	Westminster Vestry	G. R. W. Wheeler	do.
*House with Coachhouse, &c. near Weybridge	.....	G. M. Bruce Vaughan	do.
Sewerage Works, Aberdovey	Towyn U.D.C.	M. W. Davies	Mar. 21
Pipe Sewers (1,000 yards), &c.	Cannock R.D.C.	J. E. Wilcox	do.
Shops and Premises, High East-street, Dorchester	.....	Arthur Tilley	Mar. 22
*Road Works and Erection of Iron Fencing	Walthamstow U.D.C.	G. W. Holmes	do.
Surveyors' Materials, Bamber Bridge (Lancs.)	Walton-le-Dale U.D.C.	*Official*	do.
School, Berry-lane, Longridge, Preston, Lancs.	Managers of Cave Memorial School	J. A. Seward	Mar. 29
*New Buildings	Bridgnorth and Shropshire Infirmary	E. C. H. Maidman	Mar. 25
Outfall, Sewerage Works, Beat Bridge	Denton (Lancs.) U.D.C.	Lomax & Lomax	Mar. 28
Steel Girder Bridge over River Calder, Yorks.	Mirfield D.C.	F. H. Hare	do.
*Erection of Sorting Office at Wood Green	Com. of H.M. Works	*Official*	do.
Roadway and Approaches to Bridge, Bridge Sollars, Hereford	.....	R. L. Bamford	do.
*Bridge (Iron), near Builth	Brecon C. C.	W. Williams	do.
*Timber-Framed Firing Battery, &c. &c. Buddon, Forfarshire	Admiralty	*Official*	Mar. 29
*Sewerage Works	Ware R.D.C.	Bailey, Denton, Son, & North	April 1
*Erection of Schools	Edmonton Sch. Bd.	P. B. Freeman	April 2
*Laying-out Land for Irrigation Purposes, &c.	New Windsor Town Council	W. Menzies	April 4
Stores, Bakery, House, &c. Wellingborough-road, Rushden, Northants	Rushden Indus. Co-op. Soc. Ltd.	H. Aduitt	No date
Additions, &c. to The Court, Michaelchurch, Exley, Hereford	H. R. Trafford	W. W. Robinson	do.
Extension of Engineers' Works, Leeds	John Ratcliffe & Sons	.....	do.
*Prudential Buildings, Manchester	.....	Waterhouse & Son	do.
Pair Semi-detached Villas, Otley, Yorks.	.....	Fairbank & Wall	do.
Synagogue, Cardiff	.....	Delissa Joseph	do.
Five Houses, Hoyland Common, Yorks.	.....	W. J. Taylor	do.
Primitive Methodist Chapel and Schools, Hucknall Torkard (Notts.)	.....	Hy. Harper	do.
*Various Works at Workhouse	Elham Union	J. Gardner & J. Ladds	do.
*West Monmouth Boys' School	Haberdashers' Co.	H. Stock	do.
*Building Materials and Tools	Prison Department	*Official*	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Surveyor	Rochford R.D.C.	150*l.*	Mar. 8
*Surveyor and Inspector of Nuisances	Portland U.D.C.	150*l.*	Mar. 12
Highway Surveyor	Glanford Brigg R.D.C.	200*l.*	Mar. 14
Highway Surveyor, near Lincoln	Branston R.D.C.	140*l.*	do.
Surveyor's Assistant	Cambridge Town C.	2*l.* per week	Mar. 15
Electrical Engineer	Walsall Corp.	150*l.*	Mar. 16
Highway Surveyor	Dunmow R.D.C.	160*l.*	do.
Surveyor	Rotherham R.D.C.	250*l.*	Mar. 17
Engineer and Surveyor	Wrexham R.D.C.	120*l.*	Mar. 20
*Engineering Assistant	Blackburn Corp.	130*l.*	Mar. 21
*Surveyor and Inspector of Nuisances	Swanage U.D.C.	100*l.*	April 1

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv., vi., viii., *and* xxi. *Public Appointments, p.* xix.

Sanitary Officers).—Dr. J. F. J. Sykes on "Objects and Methods of Inspection." 8 p.m.

SATURDAY, MARCH 9.

Architectural Association.—Visit to the Brompton Oratory. 3 p.m.

Sanitary Institute (*Lectures and Demonstrations for Sanitary Officers*).—Inspection and Demonstration of Friern Barnet Sewage Works.

Queen's College, Cork.—Mr. Arthur Hill on "The History of Architecture." XIV. 3 p.m.

MONDAY, MARCH 11.

Royal Institute of British Architects.—(1) Special General Meeting to elect the Royal Gold Medallist for the current year: The Chairman to move—"That, subject to Her Majesty's gracious sanction, the Royal Gold Medal for the promotion of Architecture be presented this year to Mr. James Brooks, Vice-President, for his executed works as an Architect." (2) The Tenth General Meeting (Business) of the Session will be held at the conclusion of the above-mentioned Special General Meeting. 8 p.m.

Clerks of Works' Association (*Carpenters' Hall*).—Paper by Professor Banister Fletcher. 7.30 p.m.

Liverpool Architectural Society.—Mr. Percy S. Worthington (Manchester) on "Churches of the Twelfth and Thirteenth Centuries in Burgundy." 6.30 p.m.

TUESDAY, MARCH 12.

Institution of Civil Engineers.—(1) Mr. William Duff Bruce on "The Kidderpur Docks, Calcutta." (2) Mr. James Henry Apjohn, M.A., on "The Movement of the Walls of the Kidderpur Docks." 8 p.m.

Sanitary Institute (*Lectures and Demonstrations for Sanitary Officers*).—Dr. Arthur Newsholme on "Nature of Nuisances, including Nuisances the Abatement of which is difficult." 8 p.m.

Glasgow Architectural Association.—Visit to Titwood Established Church. Mr. H. E. Clifford, architect. 5.30 p.m.

WEDNESDAY, MARCH 13.

Architects' Benevolent Society (*9, Conduit-street, W.*).—Annual General Meeting of Subscribers and Donors. 5 p.m.

Carpenters' Company (*Free Lectures on Matters Connected with Building*).—Professor Banister Fletcher on "Comparisons and Contrasts in Architecture." 8 p.m.

St. Paul's Ecclesiological Society—The Rev. Canon Browne, F.S.A., on "Some Inscriptions of the British Church." 7.30 p.m.

Sanitary Institute.—A Discussion to be opened on "Back-to-Back Houses," by Dr. James Niven, with Illustrations of various types of Back-to-Back Houses met with in practice, and the methods adopted for dealing with this class of property, by Mr. Thomas De Courcy Meade. 8 p.m.

Sanitary Institute (*Lectures and Demonstrations for Sanitary Officers*).—Inspection and demonstration of the disinfecting station, &c., at St. Pancras. 3 p.m.

Northern Architectural Association.—Paper by Mr. J. M. Moncrieff. 7.30 p.m.

THURSDAY, MARCH 14.

Society of Arts.—Professor Hubert Herkomer, R.A., on "Art Tuition." 4.30 p.m.

Society for the Encouragement of the Fine Arts.—First *conversazione*, at the Gallery of the Royal Institute of Painters in Water Colours, Piccadilly.

Society of Antiquaries.—8.30 p.m.

Civil and Mechanical Engineers' Society.—Mr. S. à Court on "Lifts: Hydraulic and Electric." 7 p.m.

Institution of Electrical Engineers.—Mr. N. S. Keith on "The Electrolysis of Gold." 8 p.m.

FRIDAY, MARCH 15.

Architectural Association.—Mr. J. W. Singer on "Iron and Brass." 7.30 p.m.

Royal Institution.—Professor Roberts-Austen on "The Rarer Metals and their Alloys." 7 p.m.

Sanitary Institute (*Lectures and Demonstrations for Sanitary Officers*).—Professor A. Bostock Hill on "Trade Nuisances." 8 p.m.

SATURDAY, MARCH 16.

Architectural Association.—Visit to the Chelsea Town Hall, Polytechnic, and Free Library (see advt. on front page).

St. Paul's Ecclesiological Society.—Visit to Sir John Soane's Museum, No 13, Lincoln's Inn Fields, under the guidance of Mr. George H. Birch, F.S.A., at 3.30 p.m.

Sanitary Institute (*Lectures and Demonstrations for Sanitary Officers*).—Inspection at the Aylesbury Dairy Company's Premises.

Edinburgh Architectural Association.—Visit to Liberton House.

Queen's College, Cork.—Mr. Arthur Hill on the "History of Architecture." XV. 3 p.m.

Junior Engineering Society.—Visit to the Midland Railway's Goods Station and Depot and Repairing Shops, St. Pancras. 3 p.m.

SUNDAY, MARCH 17.

South Place Institute.—Miss Frances Hicks on "Factory and Workshop Inspection." 4 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

2,272.—WINDOW-FASTENER: *F. Gunton.*—This invention consists of a sliding bolt carried upon the one sash for entering a casing fixed upon the other sash and locking the two together. A catch controlled by a spring on being liberated turns upon its centre and further secures the two sashes.

2,911.—WINDOW-CATCH: *W. Blair.*—According to this invention a cone-shaped striking piece is fitted to the upper sash, which, on closing window, is pressed into a locking piece on the lower sash, making a kind of dovetail connexion. A bolt with a wedge-shaped nose is forced into a recess in the striking piece by a spring and completes the arrangement.

4,632.—ASBESTOS CEMENT: *A. Kuhlewein.*—A material for protecting wood and iron structures against the weather, rendering them fireproof. Asbestos is mixed with substances such as gypsum, lime, powdered chalk, powdered fireclay, graphite, &c., in various proportions.

5,868.—SEWER-PIPES: *W. Morris.*—For easy inspection of the street upright ventilating pipe, and to keep out the roadway dirt, a cast-iron box, with a hinged lid, is laid over the pipe upon a layer of cement. A channel is formed at the side in the interior of the box, and the lid is provided with corresponding openings.

6,085.—WATER-CLOSETS: *J. Shanks.*—Relates to closets in which the basin is discharged by syphonage through a trap-bend. The basin and trap-bend is constructed in one or more pieces, with the discharge passage extending downwards from the bottom of the basin in a vertical direction, and communicating at its base with the ascending leg of the syphon-trap bend. The ascending leg is thus made longer, and a second trap-bend is rendered unnecessary.

14,255.—WEATHER EXCLUDERS: *J. Hayward.*—To prevent draught, dust, &c., from entering under doors, &c., a metal bar is hinged to the floor across the doorway, which rises or falls as the door is opened or shut. On closing the door a hook, catching the bar, raises it on its edge.

20,797.—W. G. F. MULLER.—Relates to a closet basin, constructed with a baffle or shell made separately from the basin, and secured over the delivery passage in such a way as to form lateral exits or discharging openings.

20,855.—LAVATORY BASINS: *M. Adams.*—Relates chiefly to the carrying away of the water after use. A chamber is formed in the body of the material beneath the bottom of the basin; over it is seated the waste-plug. A trap is fixed beneath the basin, and helps to support it.

NEW APPLICATIONS FOR LETTERS PATENT.

FEBRUARY 18.—3,434, A. Collis, Preventing Bursting of Kitchen and like Boilers.—3,456, W. Pullen, Soldering-Irons.—3,474, A. Jones, Waste Plugs for Lavatories, &c.—3,495, H. Silvester, Stair Treads, Floors, and similar surfaces.

FEBRUARY 19.—3,520, A. Wilesmith, Stoneware Drain-pipes or other analogous apparatus.—3,561, J. Kleine, Fire and Damp-proof Ceilings and Walls.—3,604, J. Worthington, Bricks and Tiles.—3,606, J. Brown, Imitation Stained Glass.—3,611, C. Bastand, Window-sashes.

FEBRUARY 20.—3,655, J. Holmes, Wedge-grip for Preventing Doors being Opened on the Outside.—3,669, P. Willis, Windows.—3,689, D. O'Neil and others, Caulking the Joint of Pipes and Drains.

FEBRUARY 21.—3,723, W. Mann and J. Pullan, Machinery for Pressing Bricks, Tiles, &c.—3,744, S. Ingham and others, Wood-working Machinery.—3,746, S.

Bromley, Machinery for Pressing Bricks.—3,747, V. Beronius, Planing and Moulding Wood.—3,749, A. Schindler and H. Breuer, Theodolites.—3,759, E. and E. Kerry, Shaping Bricks for Gauged and Moulded Brick-work, and also for Shaping Stone.—3,760, J. Gordon, Preventing Bursts in Water-Pipes through Action of Frost or Other Changes of Temperature.—3,762, H. James, Automatic Door-Closing Apparatus.—3,773, J. Parker, Bakers' Ovens.—3,774, E. Collier, Securing Door Knobs on their Spindles.—3,778, F. and L. Koerfer, of the firm of J. Nachfolger, Device for Opening and Closing Skylights or Fanlights.

FEBRUARY 22.—3,801, M. Wrigley, Window Fastener.—3,842, H. and W. Bongartz, Zinc Roofing.—3,868, W. Standing, Plug or Stopper for Use in Testing the Efficiency of Drain and Other Pipes.

FEBRUARY 23.—3,896, A. Murray and T. Highet, Sash Windows.—3,900, W. McCaig, Preventing Explosions of Kitchen Boilers.—3,916, T. Smith, Temporarily Repairing Burst Water-Pipes, &c.—3,917, H. and A. Shaw, Dies for Bricks.—3,941, H. Kennard and D. Campbell, Open Fire-place Fittings.—3,946, P. Kuhn, Roof Covering.

PROVISIONAL SPECIFICATIONS ACCEPTED.

936, A. Platt, Ceiling Protector and Ventilator.—1,200, S. Adams, Flushing and Ventilating Sewers, &c.—2,201, J. Holt and others, Crucibles, Fireclay, Refractory and Non-Conducting Bricks and Blocks, Furnace Linings, &c.—2,268, S. Bastow, Windows.—2,469, T. Weasden, Tile.—2,486, P. Treadgold, Appliance to be Affixed to Doors, &c., to Prevent the Entrance of Wind, Snow, &c.—2,694, W. Ingham, Ventilation as Applied to Window-sashes.—2,703, H. Green, Rising Butt Hinges and other Hinges.—2,977, H. Ehrhardt, Circular Saws.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.

5,810, J. Flower and R. Cousins, Scaffolding.—7,767, M. Lee, Stoves.—8,003, W. Heywood and W. Curbstone, Glazing and Roofing Buildings.—11,894, S. Burgess, Hooks and Catches for Doors.—704, E. and J. Podmore, Glazing Bars for Glazing Greenhouses, Railway-stations, and other Glazed Structures.—1,539, J. Frei, Hinges.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

FEBRUARY 25.—By *Robins, Snell, & Gore:* 10 to 24 even, Tonsley Hill, Wandsworth, u.t. 67 yrs., g.r. 14*l.* 8s., 96*l.*; 55 to 58, Britannia-st., City-rd., f., 85*l.*—By *H. Hooper:* 16, Kelvin-rd., Highbury, u.t. 64 yrs., g.r. 8*l.*, 33*l.*; 18, Kelvin-rd., u.t. 64 yrs., g.r. 8*l.*, r. 52*l.*, 315*l.*

FEBRUARY 26.—By *Debenham, Tewson, Farmer & Bridgewater:* F.g.r. of 300*l.*, Barbican, City of London, reversion in 69 yrs., 9,100*l.*; the site of the "Old Fountain" Tavern, Little Catherine-st., Strand, area 740 ft., f., 750*l.*; "Connemara," Venner-rd., Sydenham, f., r. 38*l.*, 415*l.*; the residences "Dynevor" and "Llanfyllin," Venner-rd., f., r. 74*l.*, 840*l.*; "Dunolly," Venner-rd., f., r. 35*l.* 410*l.*; "The Gables," Venner-rd., f., 510*l.*; 16, 17, and 18, Byne-rd., f., r. 104*l.*, 1,170*l.*; 3, 5, 7, and 9, King Arthur-st., Peckham, u.t. 48 yrs., g.r. 12*l.* 12s., 600*l.*; 2 to 12 even, Basing-rd., u.t. 70 yrs., g.r. 22*l.* 10s., r. 170*l.* 6s., 740*l.*; 111 to 117 odd, Brayard's-rd., u.t. 62 yrs., g.r. 21*l.*, 950*l.*; 61, 63, and 65, Bird-in-Bush-rd., u.t. 72 yrs., g.r. 15*l.*, 530*l.*; 8, Maisemore-ter., u.t. 42 yrs., g.r. 4*l.* 4s., 135*l.*; 86, Peckham Pk.-rd., u.t. 42 yrs., g.r. 7*l.* 7s., 150*l.*; 2, 3, 4, 5, 6, and 9, Maisemore-ter., u.t. 42 yrs., g.r. 44*l.* 2s., 600*l.*; 27, 31, and 33, Anerley-st., Battersea, u.t. 70 yrs., g.r. 9*l.*, r. 93*l.* 12s., 555*l.*; 58 and 60, Hamilton-rd., Norwood., u.t. 85 yrs., g.r. 5*l.* 5s., r. 53*l.*, 240*l.*; 34 and 76, Hamilton-rd., u.t. 85 yrs., g.r. 5*l.* 5s., r. 67*l.* 12s., 245*l.*; 107, 109, 111, and 113, Romany-rd., u.t. 73 yrs., g.r. 4*l.*, 480*l.*; 15, 16, and 17, Cranfield Villas, u.t. 72 yrs., g.r. 10*l.* 10s., r. 78*l.*, 400*l.*—By *Ball, Norris, & Hadley:* 7, Lorne Villas, Tooting, f., r. 28*l.*, 325*l.*—By *W. W. Read & Co.:* 50, St. Kilda's-rd., Stoke Newington, u.t. 84 yrs., g.r. 9*l.* 9s., r. 50*l.*, 480*l.*; f.g.r. of 35*l.*, Church-ter., Fulham, reversion in 93 yrs., 765*l.*; f.g.r. of 18*l.* 18s., Hilmer-st., Kensington, reversion in 84 yrs., 460*l.*; f.g.r. of 11*l.* 11s., Hilmer-st., reversion in 79 yrs., 290*l.*; f.g.r. of 6*l.*, Dieppe-st., reversion in 84 yrs., 150*l.*; f.g.r. of 17*l.* 10s., Cornwall-rd., Lambeth, reversion in 26 yrs., 475*l.*; f.g.r. of 6*l.* 6s., Thorne-ter., Barnes, reversion in 84 yrs., 150*l.*; f.g.r. of 6*l.* 6s., Thorne-ter., reversion in 79 yrs., 150*l.*; f.g.r. of 6*l.* 6s., Mansford-st., Hackney, reversion in 94 yrs., 155*l.*; i.g.r. of 40*l.*, Oakleigh-rd., New Southgate, u.t. 55 yrs., g.r. 20*l.* 15s., 295*l.*; i.g.r. of 30*l.*, Chouncert-rd., Peckham, u.t. 166 yrs., g.r. 15*l.*, 330*l.*; i.g.r. of 24*l.*, Well-st., Hackney, u.t. 47 yrs., g.r. 4*l.* 15s., 385*l.*—By *B. Brown:* 38 and 40, Aberfeldy-st., Poplar, f., 680*l.*; 41 to 47 (odd), Aberfeldy-st., f., 1,320*l.*; 33, 35, and 37, Culloden-st., f., 820*l.*; 50, Brunswick-rd., u.t. 52 yrs., g.r. 3*l.* 10s., 205*l.*; 167 and 169, Brunswick-rd., u.t. 61 yrs., g.r. 8*l.*, 510*l.*; 20 to 32 (even), Portree-st., u.t. 78 yrs., g.r. 29*l.* 15s., 1,420*l.*; 58 and 60, Portree-st., u.t. 78 yrs., g.r. 10*l.* 10s., 240*l.*—By *C. & H. White:* 113, Gurney-rd., Stratford, u.t. 71 yrs., g.r. 4*l.* 15s., 215*l.*; 94, 96 and 98, Buxton-rd., u.t. 984 yrs., g.r. 15*l.*, r. 85*l.* 16s., 615*l.*; 1 and 3, Albert-sq., f., 720*l.*; 1 to 9 odd, Sanson-ter., f., 700*l.*; 110, Harrow-rd., Leytonstone, f., r. 32*l.*, 415*l.*; A plot of land, f., Prittlewell, Essex, 19*l.*

FEBRUARY 27.—By *Furber, Price, & Furber:* f.g.r. of 57*l.*, Detmold-rd., Clapton, reversion in 58 yrs., 1,365*l.*—By *Bayfield & Peacey:* A factory and yd., Burnaby-st., East Ham, f., 350*l.*—By *R. Tidey & Son:* 267, New North-rd., Hoxton, u.t. 38 yrs., g.r. 6*l.* 6s., r. 45*l.*, 300*l.*; 40, Southgate-rd., De Beauvoir Town, u.t. 24 yrs., g.r. 4*l.* 10s., r. 42*l.*, 260*l.*; 33, Balme's-rd., u.t. 34 yrs., g.r. 4*l.* 10s., r. 34*l.*, 330*l.*

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

* Mr. H. A. Henderson, F.S.I., auctioneer and surveyor, 70, Finsbury-pavement, E.C., has just concluded the sale of a freehold ground rent of 1,500*l.* per annum, secured by high-class residential flats at South Kensington, facing the Gardens, for the sum of 37,500*l.*

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G.	ton	8/0/0 0/0/0
Teak, E.I.	load	10/0/0 16/0/0
Sequoia, U.S. ft. cu		1/10 2/2
Ash, Canada load		3/0/0 4/5/0
Birch, do.		3/0/0 4/5/0
Elm, do.		3/15/0 5/0/0
Fir, Dantsic, &c.		2/10/0 3/5/0
Oak, do.		2/15/0 4/15/0
Canada		5/5/0 6/15/0
Pine, Canada red		2/15/0 3/5/0
Do. Yellow		3/10/0 5/15/0
Lath, Dantsic, fath		4/10/0 5/10/0
St. Petersburg		5/0/0 6/10/0
Wainscot, Riga, &c., log		2/15/0 5/0/0
Odessa, crown		2/15/0 5/0/0
Deals, Finland 2nd & 1st std 100		7/0/0 9/0/0
Do. 4th & 3rd		7/0/0 8/0/0
Do. Riga		7/0/0 8/10/0
St. Petersburg, 1st yellow		9/10/0 12/0/0
Do. 2nd yellow		7/10/0 9/0/0
Do. white		8/0/0 9/10/0
Swedish		7/0/0 15/10/0
White Sea		7/10/0 15/0/0
Canada, Pine 1st		21/0/0 24/10/0
Do. do. 2nd		16/10/0 17/10/0
Do. do. 3rd, &c.		8/0/0 10/10/0
Do. Spruce, 1st		8/10/0 10/0/0
Do. do. 3rd and 2nd		6/10/0 7/10/0
New Brunswick		6/0/0 7/0/0
Battens, all kinds		5/0/0 21/0/0
Flooring boards, sq., 1 in. prep. 1st		0/9/6 0/14/0
Do. 2nd		0/7/0 0/11/6
Other qualities—		0/5/0 0/7/0
Cedar, Cuba	ft.	/3 /4
Honduras, &c.		/3 /4½
Mahogany, Cuba St. Domingo, cargo av.		/3½ /6
Mexican do. do.		/3 /4
Tobasco do. do.		/3½ /6
Honduras do.		/3½ /5½
Box, Turkey	ton	4/0/0 15/0/0
Rose, Rio		7/0/0 16/0/0
Bahia		6/0/0 15/0/0
Satin, St. Domingo		0/0/5 0/1/0

TIMBER (*continued*).		
Satin, Porto Rico	0/0/6	0/1/6
Walnut, Italian	0/0/3½	0/0/7

METALS.		
Iron—Pig, in Scotland	ton	2/1/8½ 0/0/0
Bar, Welsh, in London		5/12/6 5/15/0
Do. do. at works in Wales		5/2/6 5/5/0
Do. Staffordshire, in London		6/0/0 6/10/0
COPPER—British cake and ingot		41/10/0 42/0/0
Best selected		42/0/0 42/10/0
Sheets, strong		50/0/0 0/0/0
Chili bars		38/13/9 38/18/9
YELLOW METAL	lb	0/0/4½ 0/0/4½
LEAD—Pig, Spanish	ton	9/10/0 9/11/3
English com. brands		9/12/6 9/15/0
Sheet, English, 6 lbs. per sq. ft. and upwards		10/15/0 11/0/0
Pipe		11/15/0 0/0/0
ZINC—English sheet	ton	18/10/0 19/0/0
Vieille Montagne		19/10/0 0/0/0
TIN—Straits		59/17/6 60/7/6
Australian		60/2/6 60/12/6
English Ingots		63/0/0 63/10/0
Banca		61/10/0 62/0/0
Billiton		60/10/0 61/0/0

OILS.		
Linseed	ton	22/10/0 20/15/0
Cocoanut, Cochin		25/0/0 0/0/0
Do. Ceylon		23/0/0 0/0/0
Palm, Lagos		23/10/0 0/0/0
Rapeseed, English pale		21/15/0 22/0/0
Do. brown		20/10/0 0/0/0
Cottonseed ref.		17/5/0 18/0/0
Oleine		19/10/0 21/10/0
Lubricating, U.S.		4/0/0 5/0/0
Do. refined		5/0/0 12/0/0
TAR—Stockholm	barrel	1/1/0 1/1/6
Archangel		0/15/0 0/16/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.*]

ALRESFORD (Hants).—For the erection of stable buildings, Langton's, for Col. H. Stratton Bates. Messrs. John Colson & Son architects, 45, Jewry-street, Winchester:—

Franklin	£1,700	Green	£1,356 10
Stephens, Bastow & Co.	1,588	Eddols	1,339 15
Humphreys	1,490	Barnard Bros	1,199 0
Fielder & Son	1,380	Hedges	1,012 0
Hutchings	1,365	Grace	970 0

BANGOR (Wales).—For the erection of Baptist chapel, Glanadda. Mr. R. Glynne Davies, architect, 220, High-street, Bangor:—

	With House and Ante-rooms.	With School-room, &c., Only.
Hugh Jones & O. Owens	£1,610	—
John Griffiths & O. Edwards	1,593	—
Watkin Jones	1,473	—
John Roberts	1,445	—
R. & J. Williams	1,430	—
Evan Williams	1,292	£1,195
Jones & Williams	1,154	1,090
David Owen, Glyn Garth, P.O. Menai Bridge	1,098	924*

* Accepted the tender for £924 for chapel and schoolroom, without house and ante-rooms.

CANTERBURY.—For alterations and additions to "The Lodge," Harbledown, for the Rev. Canon Holland. Mr. B. Vaughan Johnson, architect. Quantities by Messrs. Tucker & Huntley:—
F. T. Gentry, Canterbury £835

DARTMOUTH.—For surface drainage works, for the Corporation. Mr. T. O. Veale, Borough Surveyor. Quantities by Mr. Vincent Cattermole Brown:—

W. H. Sanders & Son	£1,812 0	R. C. Pillar	£1,510 0
W. C. Shaddock	1,793 0	Ambrose & Welch	1,474 0
J. Shaddock	1,620 0	E. Pike	1,440 0
T. Shaddock	1,542 0	M. Bridgman	1,267 10
J. T. Whetham	1,537 0	W. Brenton	1,249 0

DENVILLES.—Accepted for building a villa residence, Denvilles, Havant, for Mr. C. Kemp. Mr. A. E. Stallard, F.S.I., architect:—
G. Stallard, Havant £735

FARNHAM (Essex).—For rebuilding a mission hall for the Baptist Denomination. Mr. Alfred Brett, architect, South-street, Bishop Stortford:—

W. Wade	£296 12	Chas. Chapman	£239 0
J. H. Staines	282 0	A. Franklin	210 0
Glasscock & Son	241 10		

[Bricks, lime, and sand on the ground.]

GORING.—For repairs, Coombe End, for Mr. J. Foster, Coombe Park. Mr. J. S. Dodd, architect, Reading:—
Goodall £531 13 5

GORING.—For repairs to Goring Brewery, for Miss A. Pittman. Mr. J. S. Dodd, architect, Reading:—

Smallbone	£135	Higgs (accepted)	£119
Brasher	130		

GUILDFORD.—For additions, &c., to block at the Isolation Hospital, Woodbridge, for the Joint Hospital Board. Mr. Edward L. Lunn, architect, 36, High-street, Guildford. Quantities by the architect:—

		To be completed by
Dolling & Co.	£1,599 0	June 15, 1895
P. C. May	1,585 0	August 30, 1895
Mitchell Bros.	1,565 0	Not named
T. H. Kingerlee	1,487 0	September 29, 1895
J. Bottrill & Son	1,460 0	August 31, 1895
W. J. Butt	1,435 0	August 1, 1895
Tribe & Robinson	1,431 0	June 26, 1895
W. Smith & Sons	1,425 0	November 1, 1895
R. Smith	1,409 0	September 28, 1895
Higlett & Hammond	1,398 0	November 1, 1895
F. H. Billimore	1,362 13	June 29, 1895
Peter Peters, Horsham, Sussex (accepted)	1,300 0	June 30, 1895

[Architect's protecting estimate, £1,450.]

HASTINGS.—For the execution of sewerage works, St. Helen's-crescent, for the Corporation. Mr. P. H. Palmer, C.E., Borough Engineer, Town-hall, Hastings:—

D. H. Snow	£380 0	J. & P. Phillips	£319 10
Barter & Gasson	359 0	Saunders & Co.	311 0
G. Bell	325 0	W. Piper, 38, St. Mary's-road, Hastings*	287 13
E. Gutsell	320 0		

* Accepted.

HAVANT (Hants.).—For the erection of chapel and walls, for the Urban District Council. Mr. A. E. Stallard, surveyor, West-street, Havant. Quantities by surveyor:—

H. I. Corke	£830 0 0	I. Staples, Havant*	£812 3 4
Rogers	812 16 9		

* Accepted.

HEREFORD.—For taking down and rebuilding business premises, 146 and 147, Widemarsh-street, Hereford. Mr. W. W. Robinson, architect, 10, King-street, Hereford:—

Beaven & Hodges	£1,255	J. Davies (accepted)	£1,163
Bowers & Co.	1,162	[All of Hereford.]	

LEEK (Staffs).—Accepted for the erection of business premises, Picton-street, for the Leek and Moorlands Industrial Provident Society. Messrs. W. Sugden & Son, architects, Leek. Quantities by the architects:—

Bricklaying, Excavating, Masonry, Tiling, and Plastering.—Henry Hardy, Regent-street, Leek £728
Carpentering and Joinery.—Isaac Heath, Chorley-street, Leek 192
Plumbing, Glazing, Painting, and Gasfitting.—Isaac Heath, Ball Haye-street, Leek 80

LONDON.—For erecting new shop and premises at 332, Kentish Town-road, for Mr. Matthews. Mr. W. E. Davis, architect and surveyor, Falcon-court, 32, Fleet-street. Quantities supplied:—

Scott	£1,617	Turtle & Appleton	£1,284
Holloway Bros.	1,399	Spiers	1,249
Marchant & Hirst	1,395		

LONDON.—For the new wing and alteration to the present Fire Brigade Station in Renfrew-road, Kennington-lane, for the London County Council:—

Stimpson & Co.	£11,890	Scharien & Co.*	£11,875

* Accepted.

LONDON.—For rebuilding southern boundary wall, for the Paddington Burial Board. Mr. George Weston, Surveyor, Paddington Vestry:—

	Rebuilding Wall.	Pointing Wall, at per 100 sup. ft.
R. Ballard, Ltd.	£377 0 0	£0 11 0
Buckridge Bros.	477 0 0	1 3 3
Dainton & Sons	435 0 0	0 15 0
G. Godson & Son	400 0 0	0 7 6
J. Gibb	475 10 0	0 10 6
W. Hirst	600 0 0	1 10 0
C. J. Johnson	669 7 6	0 12 6
Kenney	321 10 0	0 15 6
S. Kendall	393 0 0	0 15 0
Martin	420 0 0	0 14 0
Merilion & Emerson	809 14 9	1 10 0
Neal, 27, Chilworth-street	*319 0 0	*0 12 0
W. Neave & Son	414 0 0	0 13 6
J. Pettipher	650 0 0	0 16 0
W. A. Prior	387 0 0	0 10 4
Pluckrose & Son (late Odney & Co.)	425 0 0	0 9 0
Spiers & Son	338 0 0	0 17 6
Vears & Co.	379 0 0	0 12 0
White	375 0 0	2 10 0
F. Mark	370 0 0	0 11 0

[Surveyor's estimate—Rebuilding wall, £338; pointing wall, 12s. per 100 sup. ft.]

* Accepted.

LONDON.—For new warehouse in Great Prescot-street, E. Mr. W. A. Longmore, architect:—

Sparks & Son	£2,125	S. J. Scott	£1,769
R. & E. Evans	2,078	W. Gladding (accepted)	1,720
Wainman	1,770		

LONDON.—For the erection of fencing, entrance gates, walls, &c., Park Hospital Estate, Hither Green, Lewisham, for the Metropolitan Asylums Board. Mr. Edwin T. Hall, architect, 57, Moorgate-street, E.C.:—

Mills	£3,950	Cooke & Son	£2,297
Wall & Co.	2,487	Foster & Dickson	2,200
Adams	2,392	Jerrard & Sons, Lewisham*	2,194

* Accepted.

LONDON.—For the erection of a boundary wall, entrance gates, &c., Grove-road, Lower Tooting, for the Metropolitan Asylums Board. Mr. A. Hessell Tiltman, architect, 6, John-street, Bedford-row, W.C. Quantities by Mr. W. F. Farthing, 46, Strand:—

H. Wall & Co.	£3,702 0 0	Peters & Son	£2,865 5 0
Higgs	3,393 0 0	Holloway Bros.	2,782 0 0
Garrett & Sons	3,101 0 0	Johnson & Co., Wandsworth Common (accepted)	2,770 0 0
Godson & Sons	3,100 0 0		
Lorden & Son	2,997 0 0		
Chinchen	2,900 0 0		

MORTIMER.—For building cottage, for Mr. Mearing. Mr. J. S. Dodd, architect, Reading:—

Wernham	£412	Wheeler	£329
Musselwhite	397	Mosdell*	317
Higgs	345		

* Accepted.

MOUNTAIN ASH (Glam.).—For enclosing, forming road and footpaths, and drainage, for cemetery, Ynysybwl, for the Urban District Council. Mr. John Williams, Surveyor, Town Hall, Mountain Ash:—

Joseph Howells	£1,260 0 0	Batchelor & Snowden	£1,127 12 1
John Rees	1,244 5 8	Williams Bros., Ynysybwl*	990 15 7½
Barnes, Chaplin & Co.	1,151 12 7		
John Jenkins	1,132 0 0		

* Accepted.

PAIGNTON.—For alterations and additions to the Commercial Hotel, for Mr. W. R. Moore. Mr. Edwd. Richards, architect, Torquay. Quantities by Mr. Vincent Cattermole Brown, Paignton:—

H. P. Rabbich	£413 0	C. & R. E. Drew	£352 10
R. Harris	388 10	Hy. Webber & Sons*	347 0

* Accepted with modifications.

PARSON'S GREEN.—For alterations to "White Horse" public-house, Parson's Green, for Messrs. James & Son. Messrs. Crickmay & Sons, architects. Quantities by Raven & Crickmay:—

Gould & Brand	£2,881	J. Carmichael	£1,936
E. Lawrance & Sons	2,230	Patrick & Sons	1,924
Holloway Bros.	2,120	F. G. Minter, Westminster (accepted)	1,900
T. Gregory & Co.	2,087		
J. Anley	2,086		

RYDE.—For pulling down and erecting new public house at Ryde for Mr. Edward Sweetman. Mr. John L. Barton, architect and surveyor, Ryde:—

C. Langdon	£1,512	J. Whitewood	£1,300
E. James	1,498	J. Barton, Ryde*	1,256

* Accepted.

RAYLEIGH (Essex).—For the erection of villa-residence and stabling. Mr. James Thompson, architect, Cliff Town-road, Southend-on-Sea. Quantities by Messrs. Curtis & Sons:—

Baker & Hainsworth	£5,475 13 6	Orlleur	£3,858 0 0
Kimberley	4,139 0 0	White & Son	3,845 0 0
Rayner	4,100 0 0	Girling & Coe	3,798 0 0
Stewart	4,091 0 0	Berry	3,791 12 0
West	4,047 0 0	Norden	3,749 0 0
Davis & Leaney	4,035 0 0	J. Brown	3,619 0 0
Badcock & Maxey	4,010 0 0	Gozzett	3,483 0 0
T. Brown	3,975 0 0	Carter	3,389 0 0

SLEAFORD (Lincs.).—For sinking well, &c., Heckington, for the Rural District Council. Mr. Jesse Clare, C.E., surveyor, Sleaford:—

Solden Hipwell	£1,700 0	Thos. Tilley & Sons	£1,518 13
W. S. Freeman	1,700 0	S. F. Pattinson	1,420 0
W. J. Botterill	1,650 0	Hy. Shardlow	1,390 0
J. H. Vickers	1,618 0	J. Pickthall & Sons	1,370 0
J. F. Price	1,595 0	G. H. Williams	1,330 0
Hy. Roberts	1,590 0		

STREATLEY.—For pair of semi-detached cottages for Mrs. Lee. Mr. J. S. Dodd, architect, Reading:—
Smallbone £750

STREATLEY.—For cottage for Mr. Mills. Mr. J. S. Dodd, architect, Reading:—
Smallbone £306

STREATLEY.—For alterations and additions to the "Swan," for Mr. G. H. Murrell. Mr. J. S. Dodd, architect, Reading:—
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* Accepted.

WATERLOOVILLE (Hants).—Accepted for building a villa residence, Waterlooville, Hants, for Mr. J. Nash. Mr. A. E. Stallard, F.S.I., architect, Havant:—
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WIMBLEDON.—Accepted for erecting house at Wimbledon. Mr. F. A. Walters, F.S.A., architect:—
F. G. Minter £1,573
[No competition.]

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Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" cannot be guaranteed for any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the front Page should be in by TWELVE noon on WEDNESDAY.

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We cannot undertake to return rejected communications.

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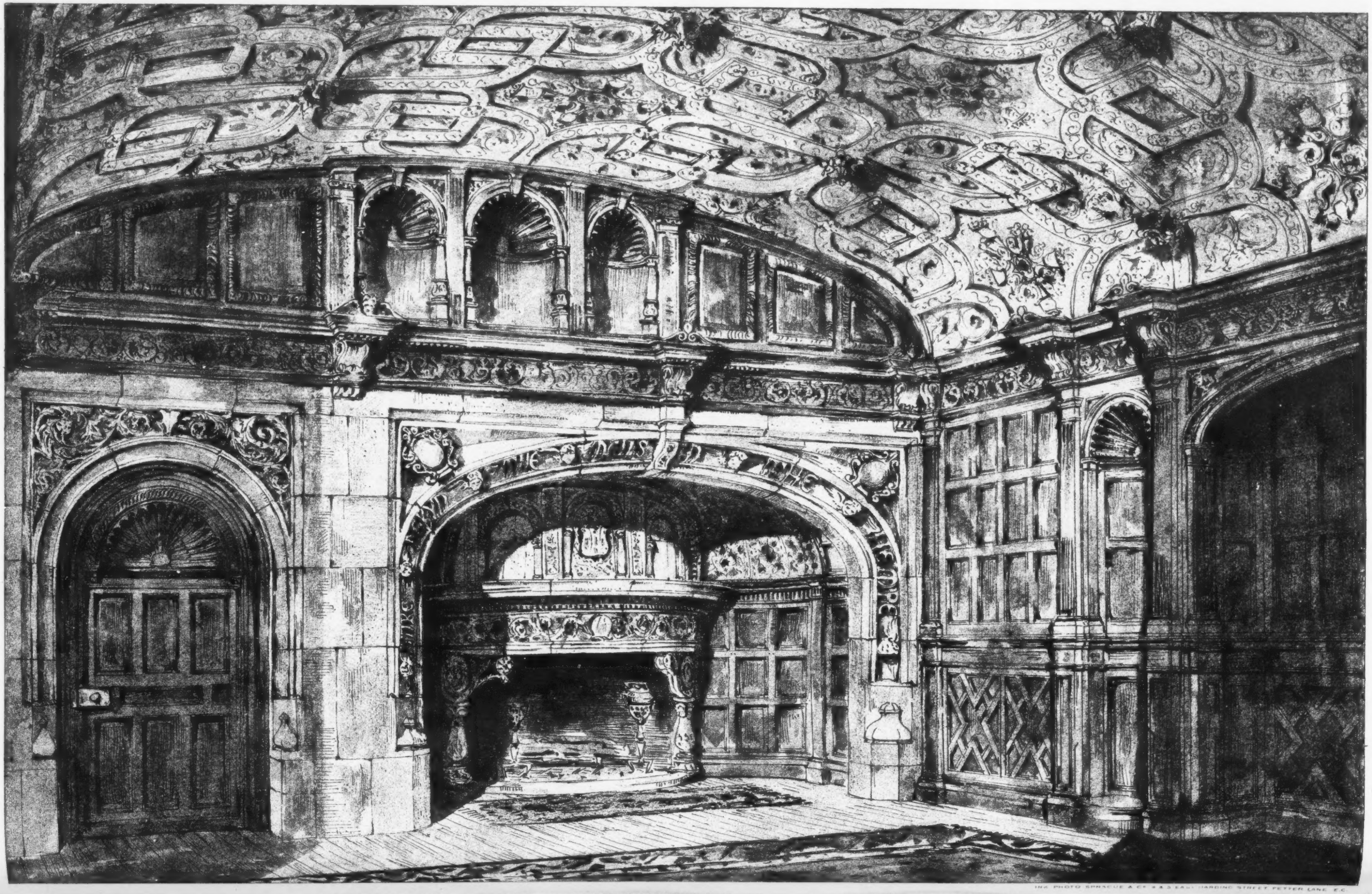
GARDEN FRONT OF A HOUSE AT ENFIELD.—Mr. T. W. Cutler, F.R.I.B.A., Architect.



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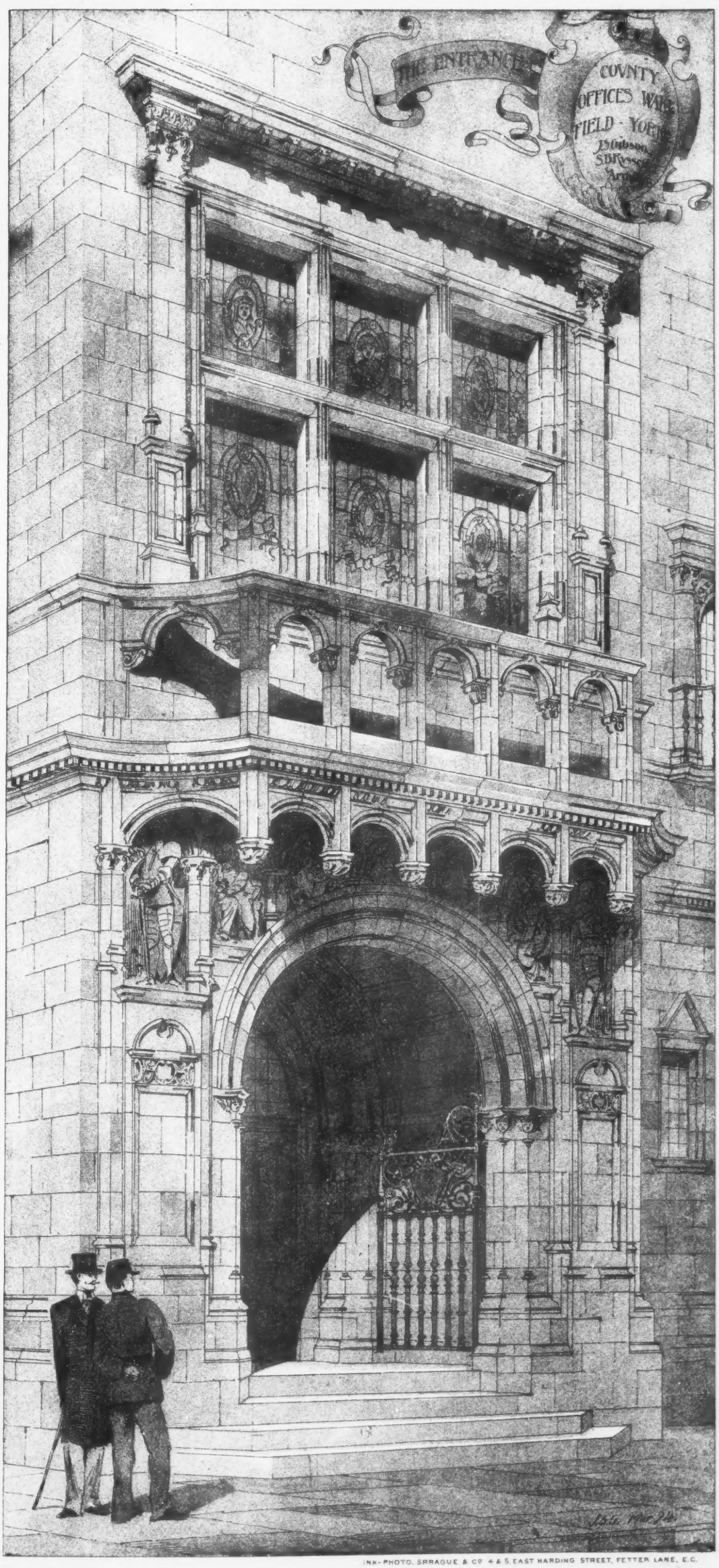

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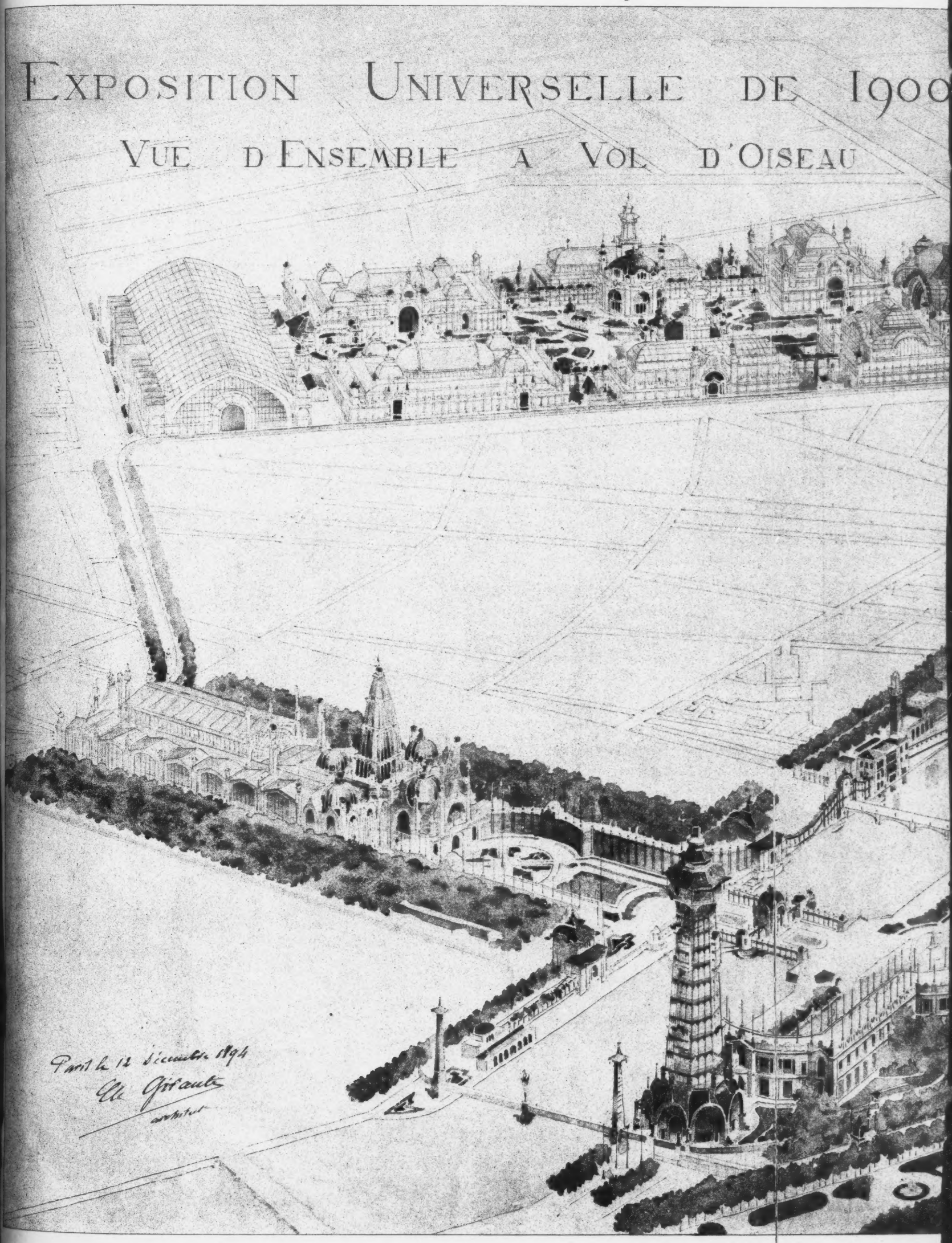

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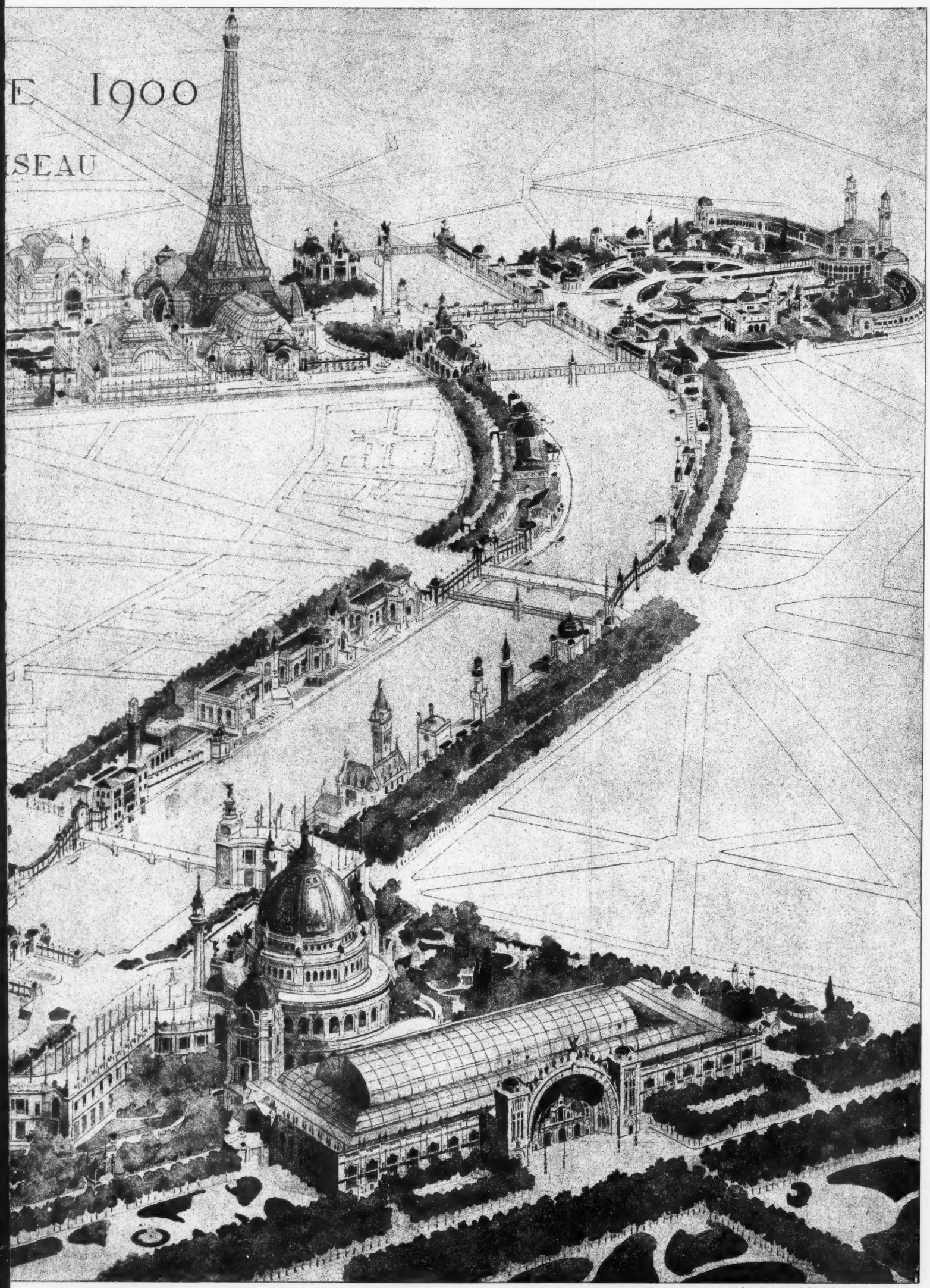

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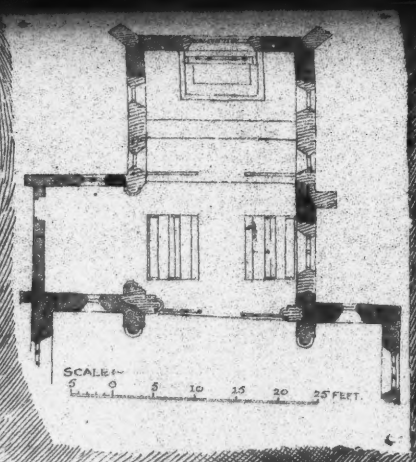

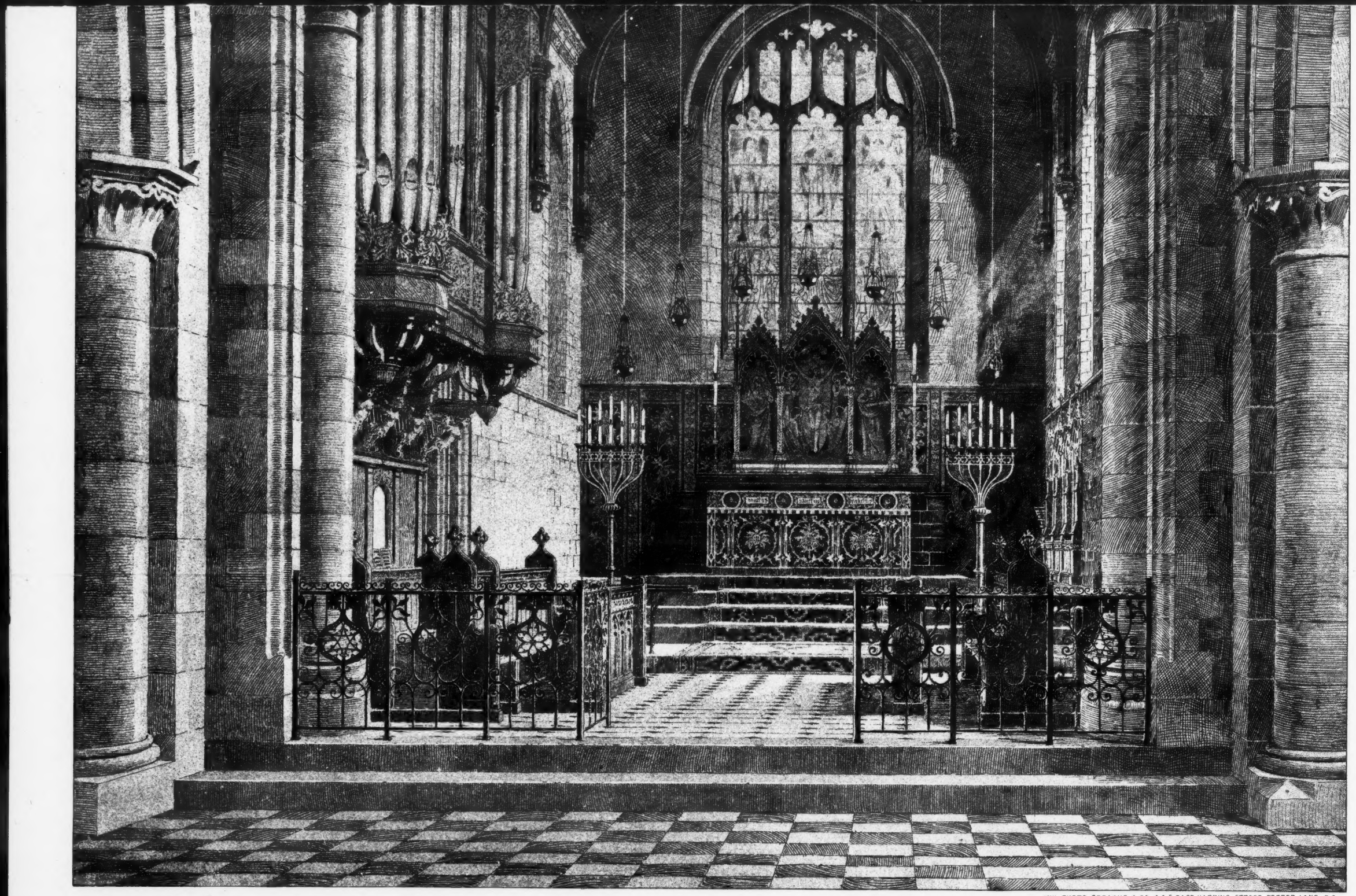

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